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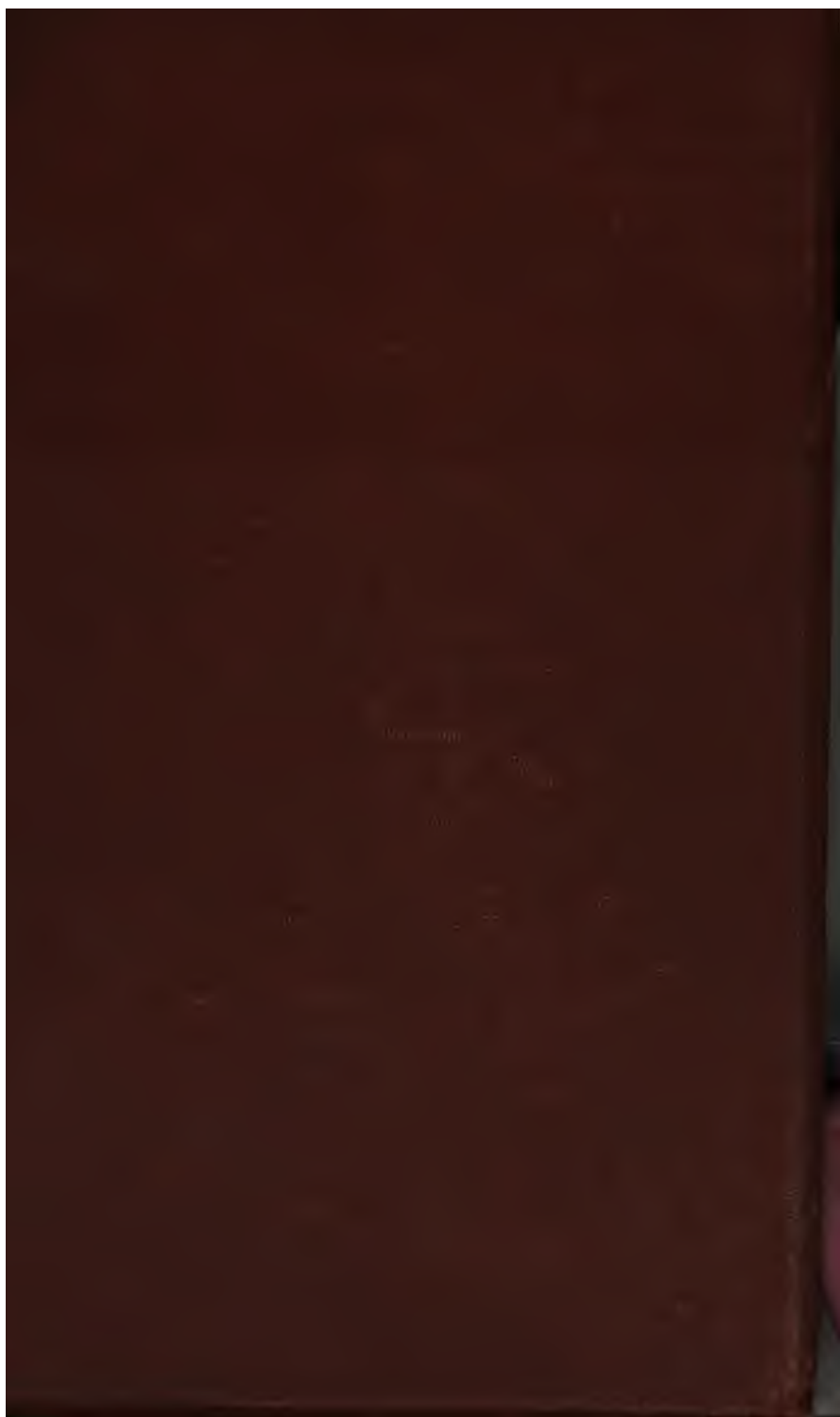
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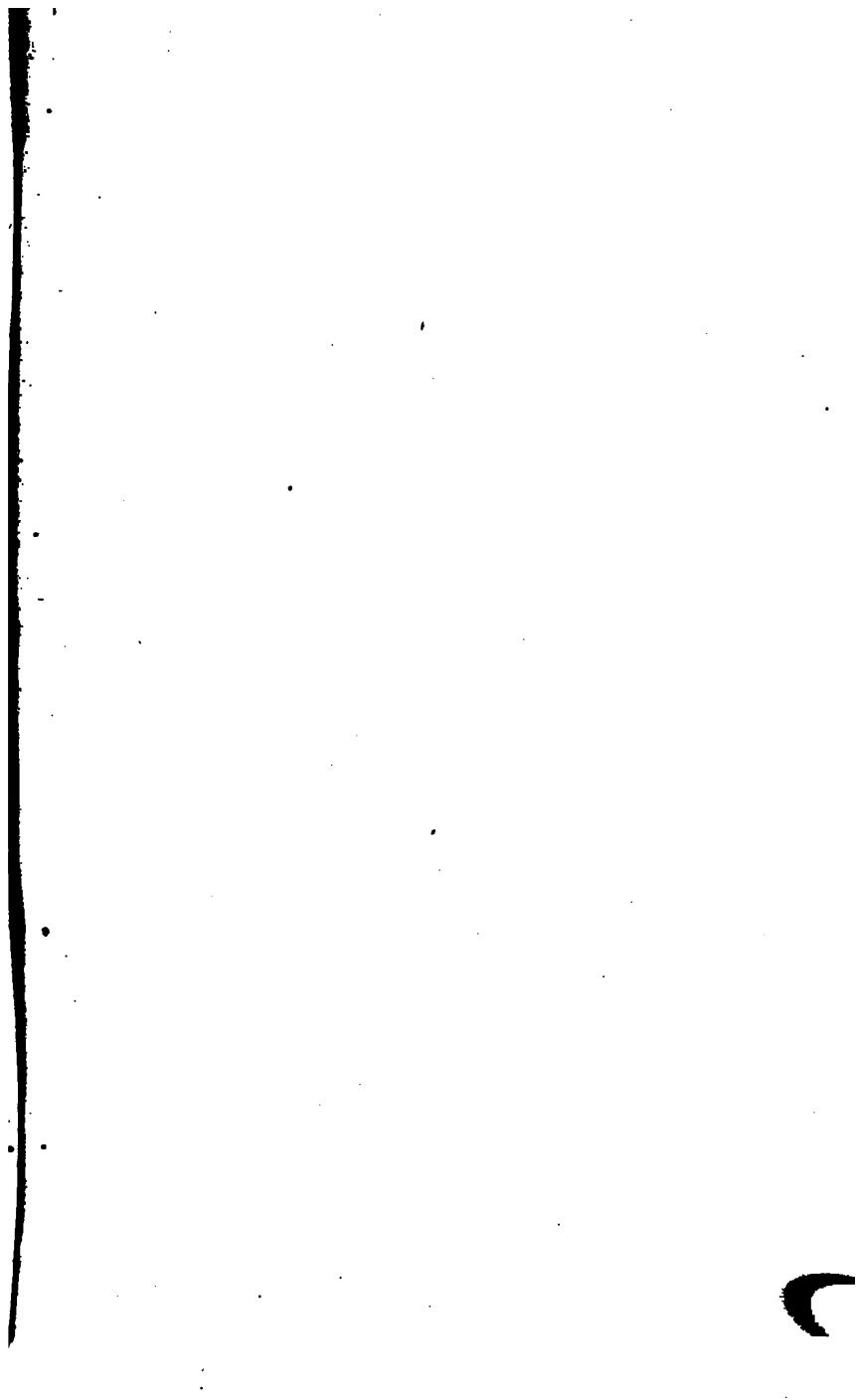
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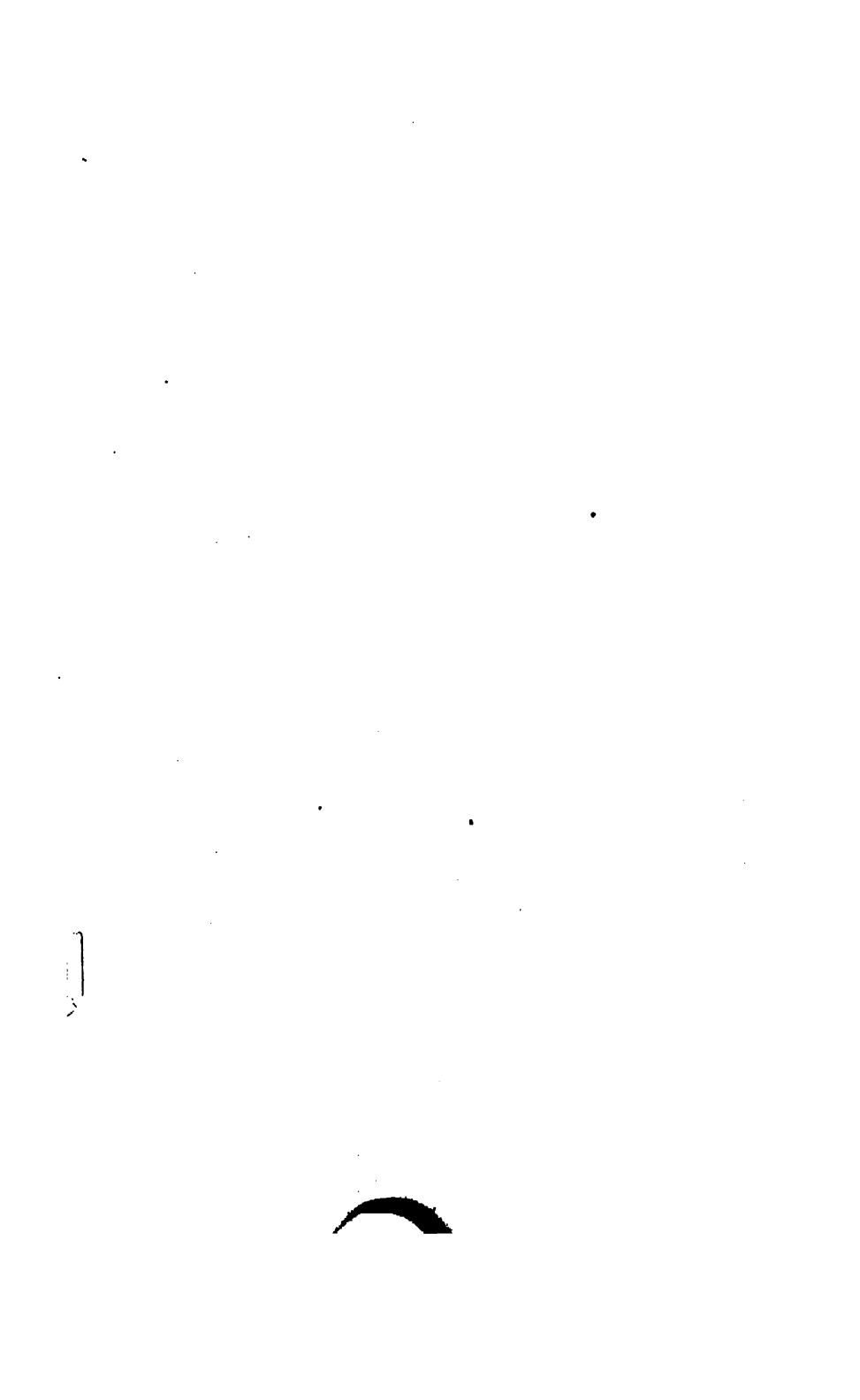


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Revised

DEUCALION.

LAPSE OF WAVES, AND LIFE OF STONES.

PARTS I. & II.

MORNINGS IN FLORENCE.

BEFORE THE SOLDAN.

PART III.

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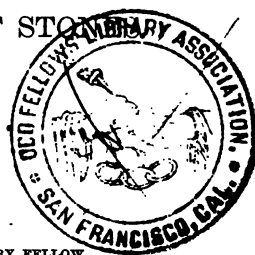
OF THE

LAPSE OF WAVES AND LIFE OF STONE

BY

JOHN RUSKIN, LL.D.,

HONORARY STUDENT OF CHRISTCHURCH, OXFORD; HONORARY FELLOW
OF CORPUS CHRISTI COLLEGE, OXFORD; AND SLADE
PROFESSOR OF FINE ART, OXFORD.



*ἐπειὴ μάλα πολλὰ μεταξὺ
οὐρεῶ τε σκίοντα, θάλασσά τε ἡχήμεσα·*

PARTS I. & II.

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УВАЖАЮЩЕЕ ОБЩЕСТВО



DEUCALION.

INTRODUCTION.

BRANTWOOD, 13th July, 1875.

I HAVE been glancing lately at many biographies, and have been much struck by the number of deaths which occur between the ages of fifty and sixty, (and, for the most part, in the earlier half of the decade,) in cases where the brain has been much used emotionally : or perhaps it would be more accurate to say, where the heart, and the faculties of perception connected with it, have stimulated the brain-action. Supposing such excitement to be temperate, equable, and joyful, I have no doubt the tendency of it would be to prolong, rather than depress, the vital energies. But the emotions of indignation, grief, controversial anxiety and vanity, or hopeless, and therefore uncontending, scorn, are all of them as deadly to the body as poisonous air or polluted water ; and when I reflect how much of the active part of my past life has been spent in these states,—and that what may remain to me of life can never more be in any other,—I begin to ask myself, with some-

what pressing arithmetic, how much time is likely to be left me, at the age of fifty-six, to complete the various designs for which, until past fifty, I was merely collecting materials.

Of these materials, I have now enough by me for a most interesting (in my own opinion) history of fifteenth-century Florentine art, in six octavo volumes; an analysis of the Attic art of the fifth century B.C., in three volumes; an exhaustive history of northern thirteenth-century art, in ten volumes; a life of Turner, with analysis of modern landscape art, in four volumes; a life of Walter Scott, with analysis of modern epic art, in seven volumes; a life of Xenophon, with analysis of the general principles of Education, in ten volumes; a commentary on Hesiod, with final analysis of the principles of Political Economy, in nine volumes; and a general description of the geology and botany of the Alps, in twenty-four volumes.

Of these works, though all carefully projected, and some already in progress,—yet, allowing for the duties of my Professorship, possibly continuing at Oxford, and for the increasing correspondence relating to *Fors Clavigera*,—it does not seem to me, even in my most sanguine moments, now probable that I shall live to effect such conclusion as would be satisfactory to me; and I think it will therefore be only prudent, however humiliating, to throw together at once, out of the heap of loose stones collected for this many-towered city which I am not able to finish, such fragments of good marble as may perchance be useful to

future builders ; and to clear away, out of sight, the lime and other rubbish which I meant for mortar.

And because it is needful, for my health's sake, henceforward to do as far as possible what I find pleasure, or at least tranquillity, in doing, I am minded to collect first what I have done in geology and botany ; for indeed, had it not been for grave mischance in earlier life, (partly consisting in the unlucky gift, from an affectionate friend, of Rogers' poems, as related in *Fors Clavigera* for August of this year,) my natural disposition for these sciences would certainly long ago have made me a leading member of the British Association for the Advancement of Science ; or—who knows?—even raised me to the position which it was always the summit of my earthly ambition to attain, that of President of the Geological Society. For, indeed, I began when I was only twelve years old, a 'Mineralogical Dictionary,' intended to supersede everything done by Werner and Mohs, (and written in a shorthand composed of crystallographic signs now entirely unintelligible to me,)—and year by year have endeavoured, until very lately, to keep abreast with the rising tide of geological knowledge ; sometimes even, I believe, pushing my way into little creeks in advance of the general wave. I am not careful to assert for myself the petty advantage of priority in discovering what, some day or other, somebody must certainly have discovered. But I think it due to my readers, that they may receive what real good there may be in these studies with franker confidence, to tell them that the

first sun-portrait ever taken of the Matterhorn, (and as far as I know of any Swiss mountain whatever,) was taken by me in the year 1849; that the outlines, (drawn by measurement of angle,) given in 'Modern Painters' of the Cervin, and aiguilles of Chamouni, are at this day demonstrable by photography as the trustworthiest then in existence; that I was the first to point out, in my lecture given in the Royal Institution,* the real relation of the vertical cleavages to the stratification, in the limestone ranges belonging to the chalk formation in Savoy; and that my analysis of the structure of agates, ('Geological Magazine,') remains, even to the present day, the only one which has the slightest claim to accuracy of distinction, or completeness of arrangement. I propose therefore, if time be spared me, to collect, of these detached studies, or lectures, what seem to me deserving of preservation; together with the more carefully written chapters on geology and botany in the latter volumes of 'Modern Painters;' adding the memoranda I have still by me in manuscript, and such further illustrations as may occur to me on revision. Which fragmentary work,—trusting that among the flowers or stones let fall by other hands it may yet find service and life,—I have ventured to dedicate to Proserpina and Deucalion.

Why not rather to Eve, or at least to one of the wives of Lamech, and to Noah? asks, perhaps, the pious modern reader.

* Reported in the 'Journal de Genève,' date ascertainable, but of no consequence.

Because I think it well that the young student should first learn the myths of the betrayal and redemption, as the Spirit which moved on the face of the wide first waters, taught them to the heathen world. And because, in this power, Proserpine and Deucalion are at least as true as Eve or Noah; and all four together incomparably truer than the Darwinian Theory. And, in general, the reader may take it for a first principle, both in science and literature, that the feeblest myth is better than the strongest theory: the one recording a natural impression on the imaginations of great men, and of unpretending multitudes; the other, an unnatural exertion of the wits of little men, and half-wits of impertinent multitudes.

It chanced, this morning, as I sat down to finish my preface, that I had, for my introductory reading the fifth chapter of the second book of Esdras; in which, though often read carefully before, I had never enough noticed the curious verse, "Blood shall drop out of wood, and the stone shall give his voice, and the people shall be troubled." Of which verse, so far as I can gather the meaning from the context, and from the rest of the chapter, the intent is, that in the time spoken of by the prophet, which, if not our own, is one exactly corresponding to it, the deadness of men to all noble things shall be so great, that the sap of trees shall be more truly blood, in God's sight, than their hearts' blood; and the silence of men, in praise of all noble things, so great, that the stones shall cry out, in God's hearing, instead of their tongues; and the

rattling of the shingle on the beach, and the roar of the rocks driven by the torrent, be truer *Te Deum* than the thunder of all their choirs. The writings of modern scientific prophets teach us to anticipate a day when even these lower voices shall be also silent; and leaf cease to wave, and stream to murmur, in the grasp of an eternal cold. But it may be, that rather out of the mouths of babes and sucklings a better peace may be promised to the redeemed Jerusalem; and the strewn branches, and low-laid stones, remain at rest at the gates of the city, built in unity with herself, and saying with her human voice, "My King cometh."

CHAPTER I.

THE ALPS AND JURA.

*(Part of a Lecture given in the Museum of Oxford, in
October, 1874.)*

1. IT is often now a question with me whether the persons who appointed me to this Professorship have been disappointed, or pleased, by the little pains I have hitherto taken to advance the study of landscape. That it is my own favourite branch of painting seemed to me a reason for caution in pressing it on your attention; and the range of art-practice which I have hitherto indicated for you, seems to me more properly connected with the higher branches of philosophical inquiry native to the University. But, as the second term of my Professorship will expire next year, and as I intend what remains of it to be chiefly employed in giving some account of the art of Florence and Umbria, it seemed to me proper, before entering on that higher subject, to set before you some of the facts respecting the great elements of landscape, which I first stated thirty years ago; arranging them now in such form as my farther study enables me to give them. I shall not, indeed, be able to do this in a course of spoken lec-

tures ; nor do I wish to do so. Much of what I desire that you should notice is already stated, as well as I can do it, in 'Modern Painters ;' and it would be waste of time to recast it in the form of address. But I should not feel justified in merely reading passages of my former writings to you from this chair ; and will only ask your audience, here, of some additional matters, as, for instance, to-day, of some observations I have been making recently, in order to complete the account given in 'Modern Painters,' of the structure and aspect of the higher Alps.

2. Not that their structure—(let me repeat, once more, what I am well assured you will, in spite of my frequent assertion, find difficult to believe,)—not that their structure is any business of yours or mine, as students of practical art. All investigations of internal anatomy, whether in plants, rocks, or animals, are hurtful to the finest sensibilities and instincts of form. But very few of us have any such sensibilities to be injured ; and that we may distinguish the excellent art which they have produced, we must, by duller processes, become cognizant of the facts. The Torso of the Vatican was not wrought by help from dissection ; yet all its supreme qualities could only be explained by an anatomical master. And these drawings of the Alps by Turner are in landscape, what the Elgin marbles or the Torso are in sculpture. There is nothing else approaching them, or of their order. Turner made them before geology existed ; but it is only by help of geology that I can prove their power.

3. I chanced, the other day, to take up a number of the 'Alpine Journal' (May, 1871,) in which there was a review by Mr. Leslie Stephen, of Mr. Whymper's 'Scrambles among the Alps,' in which it is said that "if the Alpine Club has done nothing else, it has taught us for the first time really to see the mountains." I have not the least idea whom Mr. Stephen means by 'us;' but I can assure him that mountains had been seen by several people before the nineteenth century; that both Hesiod and Pindar occasionally had eyes for Parnassus, Virgil for the Apennines, and Scott for the Grampians; and without speaking of Turner, or of any other accomplished artist, here is a little bit of old-fashioned Swiss drawing of the two Mythen, above the central town of Switzerland,* showing a degree of affection, intelligence, and tender observation, compared to which our modern enthusiasm is, at best, childish; and commonly also as shallow as it is vulgar.


4. Believe me, gentlemen, your power of seeing mountains cannot be developed either by your vanity, your curiosity, or your love of muscular exercise. It depends on the cultivation of the instrument of sight itself, and of the soul that uses it. As soon as you can see mountains rightly, you will see hills also, and valleys, with considerable interest; and a great many other things in Switzerland with which you are at present but poorly acquainted. The bluntness of your present capacity of ocular sensa-

* In the Educational Series of my Oxford Schools.

tion is too surely proved by your being unable to enjoy any of the sweet lowland country, which is incomparably more beautiful than the summits of the central range, and which is meant to detain you, also, by displaying—if you have patience to observe them—the loveliest aspects of that central range itself, in its real majesty of proportion, and mystery of power.

5. For, gentlemen, little as you may think it, you can no more see the Alps from the Col du Géant, or the top of the Matterhorn, than the pastoral scenery of Switzerland from the railroad carriage. If you want to see the skeletons of the Alps, you may go to Zermatt or Châmoûni; but if you want to see the body and soul of the Alps, you must stay awhile among the Jura, and in the Bernese plain. And, in general, the way to see mountains, is to take a knapsack and a walking-stick; leave alpenstocks to be flourished in each other's faces, and between one another's legs, by Cook's tourists; and try to find some companionship in yourself with yourself; and not to be dependent for your good cheer either on the gossip of the table-d'hôte, or the hail-fellow and well met, hearty though it be, of even the pleasantest of celebrated guides.

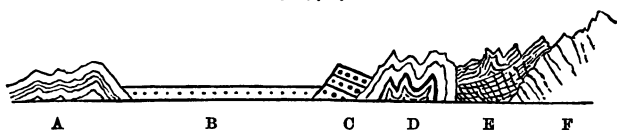
6. Whether, however, you think it necessary or not, for true sight of the Alps, to stay awhile among the Jura or in the Bernese fields, very certainly, for understanding, or questioning, of the Alps, it is wholly necessary to do so. If you look back to the lecture, which I gave as the fourth of my inaugural series, on the Relation of Art to Use, you



will see it stated, as a grave matter of reproach to the modern traveller, that, crossing the great plain of Switzerland nearly every summer, he never thinks of inquiring why it is a plain, and why the mountains to the south of it are mountains.

7. For solution of which, as it appears to me, not unnatural inquiry, all of you, who have taken any interest in geology whatever, must recognize the importance of studying the calcareous ranges which form the outlying steps of the Alps on the north; and which, in the lecture just referred to, I requested you to examine for their crag scenery, markedly developed in the Stockhorn, Pilate, and Sentis of Appenzell. The arrangements of strata in that great calcareous belt give the main clue to the mode of elevation of the central chain, the relations of the rocks over the entire breadth of North Switzerland being, roughly, as in this first section:

FIG. 1.




- A. Jura limestones, moderately undulating in the successive chains of Jura.
- B. Sandstones of the great Swiss plain.
- C. Pebble breccias of the first ranges of Alpine hills.
- D. Chalk formations violently contorted, forming the rock scenery of which I have just spoken.

E. Metamorphic rocks lifted by the central Alps.

F. Central gneissic or granitic mass, narrow in Mont Blanc, but of enormous extent southward from St. Gothard.

8. Now you may, for first grasp of our subject, imagine these several formations all fluted longitudinally, like a Gothic moulding, thus forming a series of ridges and valleys parallel to the Alps ;—such as the valley of Chamouni, the Simmenthal, and the great vale containing the lakes of Thun and Brienz ; to which longitudinal valleys we now obtain access through gorges or defiles, for the most part cut across the formations, and giving geological sections all the way from the centres of the Alps to the plain.

9. Get this first notion very simply and massively set in your thoughts. Longitudinal valleys, parallel with the beds ; more or less extended and soft in contour, and often occupied by lakes. Cross defiles like that of Lauterbrunnen, the Via Mala, and the defile of Gondo ; cut down across the beds, and traversed by torrents, but rarely occupied by lakes. The bay of Uri is the only perfect instance in Switzerland of a portion of lake in a diametrically cross valley ; the crossing arms of the lake Lucerne mark the exactly rectangular schism of the forces ; the main direction being that of the lakes of Kussnacht and Alpnacht, carried on through those of Sarnen and Lungern, and across the low intervening ridge of the Brunig, joining the depressions of Brienz and Thun ; of which last lake the



lower reach, however, is obliquely transverse. Forty miles of the Lago Maggiore, or, including the portion of lake now filled by delta, fifty, from Baveno to Bellinzona, are in the longitudinal valley which continues to the St. Bernardino: and the entire length of the lake of Como is the continuation of the great lateral Valtelline.

10. Now such structure of parallel valley and cross defile would be intelligible enough, if it were confined to the lateral stratified ranges. But, as you are well aware, the two most notable longitudinal valleys in the Alps are cut right along the heart of their central gneissic chain; how much by dividing forces in the rocks themselves, and how much by the sources of the two great rivers of France and Germany, there will yet be debate among geologists for many a day to come. For us, let the facts at least be clear; the questions definite; but all debate declined.

11. All lakes among the Alps, except the little green pool of Lungern, and a few small tarns on the cols, are quite at the bottom of the hills. We are so accustomed to this condition, that we never think of it as singular. But in its unexceptional character, it is extremely singular. How comes it to pass, think you, that through all that wilderness of mountain—raised, in the main mass of it, some six thousand feet above the sea, so that there is no col lower,—there is not a single hollow shut in so as to stay the streams of it;—that no valley is ever barred across by a ridge which can keep so much as ten feet of water

calm above it,—that every such ridge that once existed has been cut through, so as to let the stream escape?

I put this question in passing; we will return to it: let me first ask you to examine the broad relations of the beds that are cut through. My typical section, Fig. 1, is stringently simple; it must be much enriched and modified to fit any locality; but in the main conditions it is applicable to the entire north side of the Alps, from Annecy to St. Gall.

12. You have first—(I read from left to right, or north to south, being obliged to do so because all Studer's sections are thus taken)—this mass of yellow limestone, called of the Jura, from its development in that chain; but forming an immense tract of the surface of France also; and, as you well know, this our city of Oxford stands on one of its softer beds, and is chiefly built of it. We may, I think, without entering any forbidden region of theory, assume that this Jura limestone extends under the plain of Switzerland, to reappear where we again find it on the flanks of the great range; where on the top of it the beds drawn with fine lines in my section correspond generally to the date of our English chalk, though they are far from white in the Alps. Curiously adjusted to the chalk beds, rather than superimposed, we have these notable masses of pebble breccia, which bound the sandstones of the great Swiss plain.

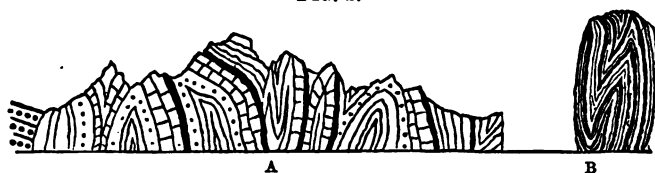
13. I have drawn that portion of the section a little more boldly in projection, to remind you of the great

Rigi promontory ; and of the main direction of the slope of these beds, with their backs to the Alps, and their escarpments to the plain. Both these points are of curious importance. Have you ever considered the reason of the fall of the Rossberg, the most impressive physical catastrophe that has chanced in Europe in modern times ? Few mountains in Switzerland looked safer. It was of inconsiderable height, of very moderate steepness ; but its beds lay perfectly straight, and that over so large a space, that when the clay between two of them got softened by rain, one slipped off the other. Now this mathematical straightness is characteristic of these pebble beds,—not universal in them, but characteristic of them, and of them only. The limestones underneath are usually, as you see in this section, violently contorted ; if not contorted, they are at least so irregular in the bedding that you can't in general find a surface of a furlong square which will not either by its depression, or projection, catch and notch into the one above it, so as to prevent its sliding. Also the limestones are continually torn, or split, across the beds. But the breccias, though in many places they suffer decomposition, are curiously free from fissures and rents. The hillside remains unshattered unless it comes down in a mass. But their straight bedding, as compared with the twisted limestone, is the notablest point in them ; and see how very many difficulties are gathered in the difference. The crushed masses of limestone are supposed to have been wrinkled together by the lateral

thrust of the emerging protogines; and these pebble beds to have been raised into a gable, or broken into a series of colossal fragments set over each other like tiles, all along the south shore of the Swiss plain, by the same lateral thrust; nay, "though we may leave in doubt," says Studer, "by what cause the folded forms of the Jura may have been pushed back, there yet remains to us, for the explanation of this gabled form of the Nagelfluh, hardly any other choice than to adopt the opinion of a lateral pressure communicated by the Alps to the tertiary bottom. We have often found in the outer limestone chains themselves clear evidence of a pressure going out from the inner Alps; and the pushing of the older over the younger formations along the flank of the limestone hills, leaves hardly any other opinion possible."

14. But if these pebble beds have been heaved up by the same lateral thrust, how is it that a force which can

FIG. 2.




bend limestone like leather, cannot crush anywhere, these pebble beds into the least confusion? Consider the scale on which operations are carried on, and the forces of which this sentence of Studer's so serenely assumes the action. Here, A, Fig. 2, is his section of the High Sentis of Appen-

zell, of which the height is at least, in the parts thus bent, 6,000 feet. And here, B, Fig. 2, are some sheets of paper, crushed together by my friend Mr. Henry Woodward, from a length of four inches, into what you see; the High Sentis, exactly resembles these, and seems to consist of four miles of limestone similarly crushed into one. Seems, I say, remember: I never theorize, I give you the facts only. The beds *do* go up and down like this: that they have been crushed together, it is Mr. Studer who says or supposes; I can't go so far; nevertheless, I admit that he appears to be right, and I believe he is right; only don't be positive about it, and don't debate; but think of it, and examine.

15. Suppose, then, you have a bed of rocks, four miles long by a mile thick, to be crushed laterally into the space of a mile. It may be done, supposing the mass not to be reducible in bulk, in two ways: you may either crush it up into folds, as I crush these pieces of cloth; or you may break it into bits, and shuffle them over one another like cards. Now, Mr. Studer, and our geologists in general, believe the first of these operations to have taken place with the limestones, and the second with the breccias. They are, as I say, very probably right: only just consider what is involved in the notion of shuffling up your breccias like a pack of cards, and folding up your limestones like a length of silk which a dexterous draper's shopman is persuading a young lady to put ten times as much of into her gown as is wanted for it! Think, I say, what is

involved in the notion. That you may shuffle your pebble beds, you must have them strong and well knit. Then what sort of force must you have to break and to heave them? Do but try the force required to break so much as a captain's biscuit by a slow push,—it is the illustration I gave long ago in 'Modern Painters,'—and then fancy the results of such fracturing power on a bed of conglomerate two thousand feet thick! And here is indeed a very charming bookbinder's pattern, produced by my friend in crushed paper, and the length of silk produces lovely results in these arrangements à la Paul Veronese. But when you have the cliffs of the Diablerets, or the Dent du Midi of Bex, to deal with; and have to fold *them* up similarly, do you mean to fold your two-thousand-feet-thick Jura limestone in a brittle state, or a ductile one? If brittle, won't it smash? If ductile, won't it squeeze? Yet your whole mountain theory proceeds on the assumption that it has neither broken nor been compressed,—more than the folds of silk or coils of paper.

16. You most of you have been upon the lake of Thun. You have been at least carried up and down it in a steamer; you smoked over it meanwhile, and countenanced the Frenchmen and Germans who were spitting into it. The steamer carried you all the length of it in half an hour; you looked at the Jungfrau and Blumlis Alp, probably, for five minutes, if it was a fine day; then took to your papers, and read the last news of the Tichborne case; then you lounged about,—thought it a nuisance that the



steamer couldn't take you up in twenty minutes, instead of half an hour; then you got into a row about your luggage at Neuhaus; and all that you recollect afterwards is that lunch where you met the so-and-sos at Interlaken.

17. Well, we used to do it differently in old times. Look here;—this * is the quay at Neuhaus, with its then travelling arrangements. A flat-bottomed boat, little better than a punt;—a fat Swiss girl with her schatz, or her father, to row it; oars made of a board tied to a pole: and so one paddled along over the clear water, in and out among the bays and villages, for half a day of pleasant life. And one knew something about the lake, ever after, if one had a head with eyes in it.

It is just possible, however, that some of you also who have been learning to see the Alps in your new fashion, may remember that the north side of the lake of Thun consists, first, next Thun, of a series of low green hills, with brown cliffs here and there among the pines; and that above them, just after passing Oberhofen, rears up suddenly a great precipice, with its flank to the lake, and the winding wall of it prolonged upwards, far to the north, losing itself, if the day is fine, in faint tawny crests of rock among the distant blue; and if stormy, in wreaths of more than commonly torn and fantastic cloud.

18. To form the top of that peak on the north side of

* Turner's first study of the Lake of Thun, 1803.

the lake of Thun, you have to imagine forces which have taken—say, the whole of the North Foreland, with Dover castle on it, and have folded it upside-down on the top of the parade at Margate,—then swept up Whitstable oyster-beds, and put them on the bottom of Dover cliffs turned topsy-turvy,—and then wrung the whole round like a wet towel, till it is as close and hard as it will knit ;—such is the beginning of the operations which have produced the lateral masses of the higher Alps.


19. Next to these, you have the great sculptural force, which gave them, approximately, their present forms,—which let out all the lake waters above a certain level,—which cut the gorge of the Devil's Bridge—of the *Via Mala*—of Gondo—of the valley of Cluse ;—which let out the Rhone at St. Maurice, the Ticino at Faido, and shaped all the vast ravines which make the flanks of the great mountains awful.

20. Then, finally, you have the rain, torrent, and glacier of human days.

Of whose action, briefly, this is the sum.

Over all the high surfaces, disintegration—melting away—diffusion—loss of height and terror.

In the ravines,—whether occupied by torrent or glacier,—gradual incumbrance by materials falling from above ; choking up of their beds by silt—by moraine—by continual advances of washed slopes on their flanks : here and there, only, exceptional conditions occur in which a river is still continuing feebly the ancient cleav-



ing action, and cutting its ravine deeper, or cutting it back.

Fix this idea thoroughly in your minds. Since the valley of Lauterbrunnen existed for human eyes,—or its pastures for the food of flocks,—it has not been cut deeper, but partially filled up by its torrents. The town of Interlachen stands where there was once lake,—and the long slopes of grassy sward on the north of it, stand where once was precipice. Slowly,—almost with infinite slowness,—the declining and encumbering action takes place ; but incessantly, and,—as far as our experience reaches,—irredeemably.

21. Now I have touched in this lecture briefly on the theories respecting the elevation of the Alps, because I want to show you how uncertain and unsatisfactory they still remain. For our own work, we must waste no time on them ; we must begin where all theory ceases ; and where observation becomes possible,—that is to say, with the forms which the Alps have actually retained while men have dwelt among them, and on which we can trace the progress, or the power, of existing conditions of minor change. Such change has lately affected, and with grievous deterioration, the outline of the highest mountain of Europe, with that of its beautiful supporting buttresses,—the *aiguille de Bionassay*. I do not care, and I want you not to care,—how crest or *aiguille* was lifted, or where its materials came from, or how much bigger it was once. I do care that you should know, and I will endeavour in

these following pages securely to show you, in what strength and beauty of form it has actually stood since man was man, and what subtle modifications of aspect, or majesties of contour, it still suffers from the rains that beat upon it, or owes to the snows that rest.

CHAPTER II.

THE THREE ÆRAS.

(Part of a Lecture given at the London Institution in March, 1875, with added pieces from Lectures in Oxford.)

1. WE are now, so many of us, some restlessly and some wisely, in the habit of spending our evenings abroad, that I do not know if any book exists to occupy the place of one classical in my early days, called 'Evenings at Home.' It contained, among many well-written lessons, one, under the title of 'Eyes and No Eyes,' which some of my older hearers may remember, and which I should myself be sorry to forget. For if such a book were to be written in these days, I suppose the title and the moral of the story would both be changed; and, instead of 'Eyes and No Eyes,' the tale would be called 'Microscopes and No Microscopes.' For I observe that the prevailing habit of learned men is now to take interest only in objects which cannot be seen without the aid of instruments; and I believe many of my learned friends, if they were permitted to make themselves, to their own liking, instead of suffering the slow process of selective development, would give

themselves heads like wasps', with three microscopic eyes in the middle of their foreheads, and two ears at the ends of their antennae.

2. It is the fashion, in modern days, to say that Pope was no poet. Probably our schoolboys also, think Horace none. They have each, nevertheless, built for themselves a monument of enduring wisdom ; and all the temptations and errors of our own day, in the narrow sphere of lenticular curiosity, were anticipated by Pope, and rebuked, in one couplet :

“ Why has not man a microscopic eye ?
For this plain reason,—Man is not a fly.”

While the nobler following lines,

“ Say, what avail, were finer optics given
To inspect a mite, not comprehend the heaven ? ”

only fall short of the truth of our present dulness, in that we inspect heaven itself, without understanding it.

3. In old times, then, it was not thought necessary for human creatures to know either the infinitely little, or the infinitely distant ; nor either to see, or feel, by artificial help. Old English people used to say they perceived things with their five—or it may be, in a hurry, they would say, their seven, *senses* ; and that word ‘sense’ became, and for ever must remain, classical English, derived from classical Latin, in both languages signifying, not only the bodily sense, but the moral one. If a man heard,

saw, and tasted rightly, we used to say he had his bodily senses perfect. If he judged, wished, and felt rightly, we used to say he had his moral senses perfect, or was a man 'in his senses.' And we were then able to speak precise truth respecting both matter and morality; and if we heard any one saying clearly absurd things,—as, for instance, that human creatures were automata,—we used to say they were out of their 'senses,' and were talking non-'sense.'

Whereas, in modern days, by substituting analysis for sense in morals, and chemistry for sense in matter, we have literally blinded ourselves to the essential qualities of both matter and morals; and are entirely incapable of understanding what is meant by the description given us, in a book we once honoured, of men who "by reason of use, have their *senses* exercised to discern both good and evil."

4. And still, with increasingly evil results to all of us, the separation is every day widening between the man of science and the artist—in that, whether painter, sculptor, or musician, the latter is pre-eminently a person who sees with his Eyes, hears with his Ears, and labours with his Body, as God constructed them; and who, in using instruments, limits himself to those which convey or communicate his human power, while he rejects all that increase it. Titian would refuse to quicken his touch by electricity; and Michael Angelo to substitute a steam hammer for his mallet. Such men not only do not desire, they impera-

tively and scornfully refuse, either the force, or the information, which are beyond the scope of the flesh and the senses of humanity. And it is at once the wisdom, the honour, and the peace, of the Masters both of painting and literature, that they rejoice in the strength, and rest in the knowledge, which are granted to active and disciplined life; and are more and more sure, every day, of the wisdom of the Maker in setting such measure to their being; and more and more satisfied, in their sight and their audit of Nature, that "the hearing ear, and the seeing eye,—the Lord hath made even both of them."

5. This evening, therefore, I venture to address you speaking limitedly as an artist; but, therefore, I think, with a definite advantage in having been trained to the use of my eyes and senses, as my chief means of observation: and I shall try to show you things which with your own eyes you may any day see, and with your own common sense, if it please you to trust it, account for.

Things which you may see, I repeat; not which you might perhaps have seen, if you had been born when you were not born; nor which you might perhaps in future see, if you were alive when you will be dead. But what, in the span of earth, and space of time, allotted to you, may be seen with your human eyes, if you learn to use them.

And this limitation has, with respect to our present subject, a particular significance, which I must explain to you before entering on the main matter of it.

6. No one more honours the past labour—no one more regrets the present rest—of the late Sir Charles Lyell, than his scholar, who speaks to you. But his great theorem of the constancy and power of existing phenomena was only in measure proved,—in a larger measure disputable; and in the broadest bearings of it, entirely false. Pardon me if I spend no time in qualifications, references, or apologies, but state clearly to you what Sir Charles Lyell's work itself enables us now to perceive of the truth. There are, broadly, three great demonstrable periods of the Earth's history. That in which it was crystallized; that in which it was sculptured; and that in which it is now being unsculptured, or deformed. These three periods interlace with each other, and graduate into each other—as the periods of human life do. Something dies in the child on the day that it is born,—something is born in the man on the day that he dies: nevertheless, his life is broadly divided into youth, strength, and decrepitude. In such clear sense, the Earth has its three ages: of their length we know as yet nothing, except that it has been greater than any man had imagined.

7. (THE FIRST PERIOD.)—But there was a period, or a succession of periods, during which the rocks which are now hard were soft; and in which, out of entirely different positions, and under entirely different conditions from any now existing or describable, the masses, of which the mountains you now see are made, were lifted,

and hardened, in the positions they now occupy, though in what forms we can now no more guess than we can the original outline of the block from the existing statue.

8. (THE SECOND PERIOD.)—Then, out of those raised masses, more or less in lines compliant with their crystalline structure, the mountains we now see were hewn, or worn, during the second period, by forces for the most part differing both in mode and violence from any now in operation, but the result of which was to bring the surface of the earth into a form approximately that which it has possessed as far as the records of human history extend. The Ararat of Moses's time, the Olympus and Ida of Homer's, are practically the same mountains now, that they were then.

9. (THE THIRD PERIOD.)—Not, however, without some calculable, though superficial, change, and that change, one of steady degradation. For in the third, or historical period, the valleys excavated in the second period are being filled up, and the mountains, hewn in the second period, worn or ruined down. In the second æra the valley of the Rhone was being cut deeper every day; now it is every day being filled up with gravel. In the second æra, the scars of Derbyshire and Yorkshire were cut white and steep; now they are being darkened by vegetation, and crumbled by frost. You cannot, I repeat, separate the periods with precision; but, in their characters, they are as distinct as youth from age.

10. The features of mountain form, to which during my

own life I have exclusively directed my study, and which I endeavour to bring before the notice of my pupils in Oxford, are exclusively those produced by existing forces, on mountains whose form and substance have not been materially changed during the historical period.

For familiar example, take the rocks of Edinburgh Castle, and Salisbury Craig. Of course we know that they are both basaltic, and must once have been hot. But I do not myself care in the least what happened to them till they were cold.* They have both been cold at least long-

* More curious persons, who *are* interested in their earlier condition, will find a valuable paper by Mr. J. W. Judd, in the quarterly 'Journal of the Geological Society,' May, 1875; very successfully, it seems to me, demolishing all former theories on the subject, which the author thus sums, at p. 135.

"The series of events which we are thus required to believe took place in this district is therefore as follows:—

A. At the point where the Arthur's Seat group of hills now rises, a series of volcanic eruptions occurred during the Lower Calciferous Sandstone period, commencing with the emission of basaltic lavas, and ending with that of porphyrites.

B. An interval of such enormous duration supervened as to admit of—

- a. The deposition of at least 3,000 feet of Carboniferous strata.
- b. The bending of all the rocks of the district into a series of great anticlinal and synclinal folds.
- c. The removal of every vestige of the 3,000 feet of strata by denudation.

C. The outburst, after this vast interval, of a second series of volcanic eruptions upon the *identical site* of the former ones, presenting in its

er than young Harry Percy's spur ; and, since they were last brought out of the oven, in the shape which, approximately, they still retain, with a hollow beneath one of them, which, for aught I know, or care, may have been cut by a glacier out of white-hot lava, but assuredly at last got itself filled with pure, sweet, cold water, and called, in Lowland Scotch, the 'Nor' Loch ;—since the time, I say, when the basalt, above, became hard, and the lake beneath, drinkable, I am desirous to examine with you what effect the winter's frost and summer's rain have had on the crags and their hollows ; how far the 'Kittle nine steps' under the castle-walls, or the firm slope and cresting precipice above the dark ghost of Holyrood, are enduring or departing forms ; and how long, unless the young engineers of New Edinburgh blast the incumbrance away, the departing mists of dawn may each day reveal the form, unchanged, of the Rock which was the strength of their Fathers.

11. Unchanged, or so softly modified that eye can scarcely trace, or memory measure, the work of time. Have you ever practically endeavoured to estimate the alterations of form in any hard rocks known to you, during the

succession, of events *precisely the same sequence*, and resulting in the production of rocks of *totally undistinguishable character*.

Are we not entitled to regard the demand for the admission of such a series of extraordinary accidents as evidence of the *antecedent improbability* of the theory ? And when we find that all attempts to suggest a period for the supposed second series of outbursts have successively failed, do not the difficulties of the hypothesis appear to be overwhelming ? ”

course of your own lives? You have all heard, a thousand times over, the common statements of the school of Sir Charles Lyell. You know all about alluviums and gravels; and what torrents do, and what rivers do, and what ocean currents do; and when you see a muddy stream coming down in a flood, or even the yellow gutter more than usually rampant by the roadside in a thunder shower, you think, of course, that all the forms of the Alps are to be accounted for by aqueous erosion, and that it's a wonder any Alps are still left. Well—any of you who have fished the pools of Scottish or a Welsh stream;—have you ever thought of asking an old keeper how much deeper they had got to be, while his hairs were silvering? Do you suppose he wouldn't laugh in your face?

There are some sitting here, I think, who must have themselves fished, for more than one summer, years ago, in Dove or Derwent,—in Tweed or Teviot. Can any of you tell me a single pool, even in the limestone or sandstone, where you could spear a salmon then, and can't reach one now—(providing always the wretches of manufacturers have left you one to be speared, or water that you can see through)? Do you know so much as a single rivulet of clear water which has cut away a visible half-inch of Highland rock, to your own knowledge, in your own day? You have seen whole banks, whole fields washed away; and the rocks exposed beneath? Yes, of course you have; and so have I. The rains wash the loose earth about everywhere, in any masses that they chance to catch


—loose earth, or loose rock. But yonder little rifted well in the native whinstone by the sheepfold,—did the gray shepherd not put his lips to the same ledge of it, to drink—when he and you were boys together?

12. ‘But Niagara, and the Delta of the Ganges—and—all the rest of it?’ Well, of course a monstrous mass of continental drainage, like Niagara, *will* wash down a piece of crag once in fifty years, (but only that, if it’s rotten below;) and tropical rains will eat the end off a bank of slime and alligators,—and spread it out lower down. But does any Scotchman know a change in the Fall of Fyers?—any Yorkshireman in the Force of Tees?

Except of choking up, it may be—not of cutting down. It is true, at the side of every stream you see the places in the rocks hollowed by the eddies. I suppose the eddies go on at their own rate. But I simply ask, Has any human being ever known a stream, in hard rock, cut its bed an inch deeper down at a given spot?

13. I can look back, myself, now pretty nearly, I am sorry to say, half a century, and recognize no change whatever in any of my old dabbling-places; but that some stones are mossier, and the streams usually dirtier,—the Derwent above Keswick, for example.

‘But denudation does go on, somehow: one sees the whole glen is shaped by it?’ Yes, but not by the *stream*. The stream only sweeps down the loose stones; frost and chemical change are the powers that loosen them. I have indeed not known one of my dabbling-places changed in



fifty years. But I have known the éboulement under the Rochers des Fyz, which filled the Lac de Chède; I passed through the valley of Cluse a night after some two or three thousand tons of limestone came off the cliffs of Maglans—burying the road and field beside it. I have seen half a village buried by a landslip, and its people killed, under Monte St. Angelo, above Amalfi. I have seen the lower lake of Llanberis destroyed, merely by artificial slate quarries; and the Waterhead of Couiston seriously diminished in purity and healthy flow of current by the débris of its copper mines. These are all cases, you will observe, of degradation; diminishing majesty in the mountain, and diminishing depth in the valley, or pools of its waters. I cannot name a single spot in which, during my lifetime spent among the mountains, I have seen a peak made grander, a watercourse cut deeper, or a mountain pool made larger and purer.

14. I am almost surprised, myself, as I write these words, at the strength which, on reflection, I am able to give to my assertion. For, even till I began to write these very pages, and was forced to collect my thoughts, I remained under the easily adopted impression, that, at least among soft earthy eminences, the rivers were still cutting out their beds. And it is not so at all. There are indeed banks here and there which they visibly remove; but whatever they sweep down from one side, they sweep up on the other, and extend a promontory of land for every shelf they undermine: and as for those radiating fibrous

valleys in the Apennines, and such other hills, which look symmetrically shaped by streams,—they are not lines of trench from below, but lines of wash or slip from above : they are the natural wear and tear of the surface, directed indeed in easiest descent by the bias of the stream, but not dragged down by its grasp. In every one of those ravines the water is being choked up to a higher level ; it is not gnawing down to a lower. So that, I repeat, earnestly, their chasms being choked below, and their precipices shattered above, all mountain forms are suffering a deliquescent and corroding change,—not a sculpturesque or anatomizing change. All character is being gradually effaced ; all crooked places made straight,—all rough places, plain ; and among these various agencies, not of erosion, but *corrosion*, none are so distinct as that of the glacier, in filling up, not cutting deeper, the channel it fills ; and in rounding and smoothing, but never sculpturing, the rocks over which it passes.

In this fragmentary collection of former work, now patched and darned into serviceableness, I cannot finish my chapters with the ornamental fringes I used to twine for them ; nor even say, by any means, all I have in my mind on the matters they treat of : in the present case, however, the reader will find an elucidatory postscript added at the close of the fourth chapter, which he had perhaps better glance over before beginning the third.

CHAPTER III.

OF ICE-CREAM.

*(Continuation of Lecture delivered at London Institution,
with added Illustrations from Lectures at Oxford.)*

1. THE statement at the close of the last chapter, doubtless surprising and incredible to many of my readers must, before I reinforce it, be explained as referring only to glaciers visible, at this day, in temperate regions. For of formerly deep and continuous tropical ice, or of existing Arctic ice, and their movements, or powers, I know, and therefore say, nothing.* But of the visible glaciers

* The following passage, quoted in the 'Geological Magazine' for June of this year, by Mr. Clifton Ward, of Keswick, from a letter of Professor Sedgwick's, dated May 24th, 1842, is of extreme value; and Mr. Ward's following comments are most reasonable and just:—

“No one will, I trust, be so bold as to affirm that an uninterrupted glacier could ever have extended from Shap Fells to the coast of Holderness, and borne along the blocks of granite through the whole distance, without any help from the floating power of water. The supposition involves difficulties tenfold greater than are implied in the phenomenon it pretends to account for. The glaciers descending through the valleys of the higher Alps have an enormous transporting power: but there is no such power in a great sheet of ice expanded over a country without mountains, and at a nearly dead level.”

couched upon the visible Alps, two great facts are very clearly ascertainable, which, in my lecture at the London Institution, I asserted in their simplicity, as follows :—

2. The first great fact to be recognized concerning them is that they are *Fluid* bodies. Sluggishly fluid, indeed, but definitely and completely so ; and therefore, they do not scramble down, nor tumble down, nor crawl down, nor slip down ; but *flow* down. They do not move like leeches, nor like caterpillars, nor like stones, but like, what they are made of, water.

The difficulties involved in the theories of Messrs. Croll, Belt, Goodchild, and others of the same extreme school, certainly press upon me—and I think I may say also upon others of my colleagues—increasingly, as the country becomes more and more familiar in its features. It is indeed a most startling thought, as one stands upon the eastern borders of the Lake-mountains, to fancy the ice from the Scotch hills stalking boldly across the Solway, marching steadily up the Eden Valley, and persuading some of the ice from Shap to join it on an excursion over Stainmoor, and bring its boulders with it.

The outlying northern parts of the Lake-district, and the flat country beyond, have indeed been ravished in many a raid by our Scotch neighbours, but it is a question whether, in glacial times, the Cumbrian mountains and Pennine chain had not strength in their protruding icy arms to keep at a distance the ice proceeding from the district of the southern uplands, the mountains of which are not *superior* in elevation. Let us hope that the careful geological observations which will doubtless be made in the forthcoming *scientific* Arctic Expedition will throw much new light on our past glacial period.

J. CLIFTON WARD.

KESWICK, *April 26th*, 1875.

That is the main fact in their state, and progress, on which all their great phenomena depend.

Fact first discovered and proved by Professor James Forbes, of Edinburgh, in the year 1842, to the astonishment of all the glacier theorists of his time ;—fact strenuously denied, disguised, or confusedly and partially apprehended, by all of the glacier theorists of subsequent times, down to our own day ; else there had been no need for me to tell it you again to-night.

3. The second fact of which I have to assure you is partly, I believe, new to geologists, and therefore may be of some farther interest to you because of its novelty, though I do not myself care a grain of moraine-dust for the newness of things ; but rather for their oldness ; and wonder more willingly at what my father and grandfather thought wonderful, (as, for instance, that the sun should rise, or a seed grow,) than at any newly-discovered marvel. Nor do I know, any more than I care, whether this that I have to tell you be new or not ; but I did not absolutely *know* it myself, until lately ; for though I had ventured with some boldness to assert it as a consequence of other facts, I had never been under the bottom of a glacier to look. But, last summer, I was able to cross the dry bed of a glacier, which I had seen flowing, two hundred feet deep, over the same spot, forty years ago. And there I saw, what before I had suspected, that modern glaciers, like modern rivers, were not cutting their beds deeper, but filling them up. These, then, are the two facts I

wish to lay distinctly before you this evening,—first that glaciers are fluent ; and, secondly, that they are filling up their beds, not cutting them deeper.

4. (I.) Glaciers are fluent; slowly, like lava, but distinctly.

And now I must ask you not to disturb yourselves, as I speak, with bye-thoughts about ‘the theory of regelation.’ It is very interesting to know that if you put two pieces of ice together, they will stick together ; let good Professor Faraday have all the credit of showing us that ; and the human race in general, the discredit of not having known so much as that, about the substance they have skated upon, dropped through, and eat any quantity of tons of—these two or three thousand years.

It was left, nevertheless, for Mr. Faraday to show them that two pieces of ice will stick together when they touch—as two pieces of hot glass will. But the capacity of ice for sticking together no more accounts for the making of a glacier, than the capacity of glass for sticking together accounts for the making of a bottle. The mysteries of crystalline vitrification, indeed, present endless entertainment to the scientific inquirer ; but by no theory of vitrification can he explain to us how the bottle was made narrow at the neck, or dishonestly vacant at the bottom. Those conditions of it are to be explained only by the study of the centrifugal and moral powers to which it has been submitted.

5. In like manner, I do not doubt but that wonderful

phenomena of congelation, regelation, degelation, and gelation pure without preposition, take place whenever a schoolboy makes a snowball ; and that miraculously rapid changes in the structure and temperature of the particles accompany the experiment of producing a star with it on an old gentleman's back. But the principal conditions of either operation are still entirely dynamic. To make your snowball hard, you must squeeze it hard ; and its expansion on the recipient surface is owing to a lateral diversion of the impelling forces, and not to its regelatic properties.

6. Our first business, then, in studying a glacier, is to consider the mode of its original deposition, and the large forces of pressure and fusion brought to bear on it, with their necessary consequences on such a substance as we practically know snow to be,—a powder, ductile by wind, compressible by weight ; diminishing by thaw, and hardening by time and frost ; a thing which sticks to rough ground, and slips on smooth ; which clings to the branch of a tree, and slides on a slated roof.

7. Let us suppose, then, to begin with, a volcanic cone in which the crater has been filled, and the temperature cooled, and which is now exposed to its first season of glacial agencies. Then let Plate 1, Fig. 1, represent this mountain, with part of the plans at its foot under an equally distributed depth of a first winter's snow, and place the level of perpetual snow at any point you like—for simplicity's sake, I put it halfway up the cone.

Below this snow-line, all snow disappears in summer; but above it, the higher we ascend, the more of course we find remaining. It is quite wonderful how few feet in elevation make observable difference in the quantity of snow that will lie. This last winter, in crossing the moors of the peak of Derbyshire, I found, on the higher masses of them, that ascents certainly not greater than that at Harrow from the bottom of the hill to the school-house, made all the difference between easy and difficult travelling, by the change in depth of snow.

8. At the close of the summer, we have then the remnant represented in Fig. 2, on which the snows of the ensuing winter take the form in Fig. 3; and from this greater heap we shall have remaining a greater remnant, which, supposing no wind or other disturbing force modified its form, would appear as at Fig. 4; and, under such necessary modification, together with its own deliquescence, would actually take some such figure as that shown at Fig. 5.

Now, what is there to hinder the continuance of accumulation? If we cover this heap with another layer of winter's snow (Fig. 6), we see at once that the ultimate condition would be, unless somehow prevented, one of enormous mass, superincumbent on the peak—like a colossal haystack, and extending far down its sides below the level of the snow-line.

You are, however, doubtless well aware that no such accumulation as this ever does take place on a mountain-top.

9. So far from it, the eternal snows do not so much as fill the basins between mountain-tops; but, even in these hollows, form depressed sheets at the bottom of them. The difference between the actual aspect of the Alps, and that which they would present if no arrest of the increasing accumulation on them took place, may be shown before you with the greatest ease; and in doing so I have, in all humility, to correct a grave error of my own, which strangely enough, has remained undetected, or at least unaccused, in spite of all the animosity provoked by my earlier writings.

10. When I wrote the first volume of 'Modern Painters,' scarcely any single fact was rightly known by anybody, about either the snow or ice of the Alps. Chiefly the snows had been neglected: very few eyes had ever seen the higher snows near; no foot had trodden the greater number of Alpine summits; and I had to glean what I needed for my pictorial purposes as best I could,—and my best in this case was a blunder. The thing that struck me most, when I saw the Alps myself, was the enormous accumulation of snow on them; and the way it clung to their steep sides. Well, I said to myself, 'of course it must be as thick as it can stand; because, as there is an excess which doesn't melt, it would go on building itself up like the Tower of Babel, unless it tumbled off. There must be always, at the end of winter, as much snow on every high summit as it can carry.'

There *must*, I said. That is the mathematical method

of science as opposed to the artistic. Thinking of a thing, and demonstrating,—instead of looking at it. Very fine, and very sure, if you happen to have before you all the elements of thought ; but always very dangerously inferior to the unpretending method of sight—for people who have eyes, and can use them. If I had only *looked* at the snow carefully, I should have seen that it wasn't anywhere as thick as it could stand or lie—or, at least, as a hard substance, though deposited in powder, could stand. And then I should have asked myself, with legitimate rationalism, why it didn't; and if I had but asked—Well, it's no matter what perhaps might have happened if I had. I never did.

11. Let me now show you, practically, how great the error was. Here is a little model of the upper summits of the Bernese range. I shake over them as much flour as they will carry; now I brush it out of the valleys, to represent the melting. Then you see what is left stands in these domes and ridges, representing a mass of snow about six miles deep. That is what the range would be like, however, if the snow stood up as the flour does ; and snow is at least, you will admit, as adhesive as flour.

12. But, you will say, the scale is so different, you can't reason from the thing on that scale. A most true objection. You cannot; and therefore I beg you, in like manner, not to suppose that Professor Tyndall's experiments on "a straight prism of ice, four inches long, an inch wide,

and a little more than an inch in depth," * are conclusive as to the modes of glacier motion.

In what respect then, we have to ask, would the difference in scale modify the result of the experiment made here on the table, supposing this model was the Jungfrau itself, and the flour supplied by a Cyclopean miller and his men ?

13. In the first place, the lower beds of a mass six miles deep would be much consolidated by pressure. But would they be *only* consolidated ? Would they be in nowise squeezed out at the sides ?

The answer depends of course on the nature of flour, and on its conditions of dryness. And you must feel in a moment that, to know what an Alpine range would look like, heaped with any substance whatever, as high as the substance would stand—you must first ascertain how high the given substance *will* stand—on level ground. You might perhaps heap your Alp high with wheat,—not so high with sand,—nothing like so high with dough ; and a very thin coating indeed would be the utmost possible result of any quantity whatever of showers of manna, if it had the consistence, as well as the taste, of wafers made with honey.

14. It is evident, then, that our first of inquiries bearing on the matter before us, must be, How high will snow stand on level ground, in a block or column ? Suppose

* 'Glaciers of the Alps,' p. 348.

you were to plank in a square space, securely—twenty feet high—thirty—fifty; and to fill it with dry snow. How high could you get your pillar to stand, when you took away the wooden walls? and when you reached your limit, or approached it, what would happen?

Three more questions instantly propose themselves; namely, What happens to snow under given pressure? will it under some degrees of pressure change into anything else than snow? and what length of time will it take to effect the change?

Hitherto, we have spoken of snow as dry only, and therefore as solid substance, permanent in quantity and quality. You know that it very often is not dry; and that, on the Alps, in vast masses, it is throughout great part of the year thawing, and therefore diminishing in quantity.

It matters not the least, to our general inquiry, how much of it is wet, or thawing, or at what times. I merely at present have to introduce these two conditions as elements in the business. It is not dry snow always, but often soppy snow—snow and water,—that you have to squeeze. And it is not freezing snow always, but very often thawing snow,—diminishing therefore in bulk every instant,—that you have to squeeze.

It does not matter, I repeat, to our immediate purpose, when, or how far, these other conditions enter our ground; but it is best, I think, to put the dots on the i's as we go along. You have heard it stated, hinted, suggested, im-

plied, or whatever else you like to call it, again and again, by the modern school of glacialists, that the discoveries of James Forbes were anticipated by Rendu.

15. I have myself more respect for Rendu than any modern glacialist has. He was a man of de Saussure's temper, and of more than de Saussure's intelligence; and if he hadn't had the misfortune to be a bishop, would very certainly have left James Forbes's work a great deal more than cut out for him;—stitched—and pretty tightly—in most of the seams. But he was a bishop; and could only examine the glaciers to an episcopal extent; and guess, the best he could, after that. His guesses are nearly always splendid; but he must needs sometimes reason as well as guess; and he reasons himself with beautiful plausibility, ingenuity, and learning, up to the conclusion—which he announces as positive—that it always freezes on the Alps, even in summer. James Forbes was the first who ascertained the fallacy of this episcopal position; and who announced—to our no small astonishment—that it always thawed on the Alps, even in winter.

16. Not superficially of course, nor in all places. But internally, and in a great many places. And you will find it is an ascertained fact—the first great one of which we owe the discovery to him—that all the year round, you must reason on the masses of aqueous deposit on the Alps as, practically, in a state of squash. Not freezing ice or snow, nor dry ice or snow, but in many places saturated with,—everywhere affected by,—moisture; and always


subject, in enormous masses, to the conditions of change which affect ice or snow at the freezing-point, and not below it. Even James Forbes himself scarcely, I think, felt enough the importance of this element of his own discoveries, in all calculations of glacier motion. He sometimes speaks of his glacier a little too simply as if it were a stream of *undiminishing* substance, as of treacle or tar, moving under the action of gravity only; and scarcely enough recognizes the influence of the subsiding languor of its fainting mass, as a constant source of motion; though nothing can be more accurate than his actual account of its results on the surface of the Mer de Glace, in his fourth letter to Professor Jameson.

17. Let me drive the notion well home in your own minds, therefore, before going farther. You may permanently secure it, by an experiment easily made by each one of you for yourselves this evening, and that also on the minute and easily tenable scale which is so approved at the Royal Institution; for in this particular case the material conditions may indeed all be represented in very small compass. Pour a little hot water on a lump of sugar in your teaspoon. You will immediately see the mass thaw, and subside by a series of, in miniature, magnificent and appalling catastrophes, into a miniature glacier, which you can pour over the edge of your teaspoon into your saucer; and if you will then add a little of the brown sugar of our modern commerce—of a slightly sandy character,—you may watch the rate of the flinty erosion upon the soft silver

of the teaspoon at your ease, and with Professor Ramsay's help, calculate the period of time necessary to wear a hole through the bottom of it.

I think it would be only tiresome to you if I carried the inquiry farther by progressive analysis. You will, I believe, permit, or even wish me, rather to state summarily what the facts are :—their proof, and the process of their discovery, you will find incontrovertibly and finally given in this volume, classical, and immortal in scientific literature—which, twenty-five years ago, my good master Dr. Buckland ordered me, in his lecture-room at the Ashmolean, to get,—as closing all question respecting the nature and cause of glacier movement,—James Forbes's 'Travels in the Alps.'

18. The entire mass of snow and glacier, (the one passing gradually and by infinite modes of transition into the other, over the whole surface of the Alps,) is one great accumulation of ice-cream, poured upon the tops, and *flowing* to the bottoms, of the mountains, under precisely the same special condition of gravity and coherence as the melted sugar poured on the top of a bride-cake; but on a scale which induces forms and accidents of course peculiar to frozen water, as distinguished from frozen syrup, and to the scale of Mont Blanc and the Jungfrau, as compared to that of a bride-cake. Instead of an inch thick, the ice-cream of the Alps will stand two hundred feet thick,—no thicker, anywhere, if it can run off; but will lie in the hollows like lakes, and clot and cling about the less abrupt slopes in festooned wreaths of rich mass and



sweeping flow, breaking away, where the steepness becomes intolerable, into crisp precipices and glittering cliffs.

19. Yet never for an instant motionless—never for an instant without internal change, through all the gigantic mass, of the relations to each other of every crystal grain. That one which you break now from its wave-edge, and which melts in your hand, has had no rest, day nor night, since it faltered down from heaven when you were a babe at the breast; and the white cloud that scarcely veils yonder summit—seven-colored in the morning sunshine—has strewed it with pearly hoar-frost, which will be on this spot, trodden by the feet of others, in the day when you also will be trodden under feet of men, in your grave.

20. Of the infinite subtlety, the exquisite constancy of this fluid motion, it is nearly impossible to form an idea in the least distinct. We hear that the ice advances two feet in the day; and wonder how such a thing can be possible, unless the mass crushed and ground down everything before it. But think a little. Two feet in the day is a foot in twelve hours,—only an inch in an hour, (or say a little more in the daytime, as less in the night,)—and that is maximum motion in mid-glacier. If your Geneva watch is an inch across, it is three inches round, and the minute-hand of it moves three times faster than the fastest ice. Fancy the motion of that hand so slow that it must take three hours to get round the little dial. Between the shores of this vast gulf of hills, the long wave of hastening ice only keeps pace with that lingering

arrow, in its central crest; and that invisible motion fades away upwards through forty years of slackening stream, to the pure light of dawn on yonder stainless summit, on which this morning's snow lies—motionless.

21. And yet, slow as it is, this infinitesimal rate of current is enough to drain the vastest gorges of the Alps of their snow, as clearly as the sluice of a canal-gate empties a lock. The mountain basin included between the Aiguille Verte, the Grandes Jorasses, and the Mont Blanc, has an area of about thirty square miles, and only one outlet, little more than a quarter of a mile wide: yet, through this the contents of the entire basin are drained into the valley of Chamounix with perfect steadiness, and cannot possibly fill the basin beyond a certain constant height above the point of overflow.

Overflow, I say, deliberately; distinguishing always the motion of this true fluid from that of the sand in an hour-glass, or of stones slipping in a heap of shale. But that the nature of this distinction may be entirely conceived by you, I must ask you to pause with some attention at this word, to 'flow,'—which attention may perhaps be more prudently asked in a separate chapter.

CHAPTER IV.

LABITUR, ET LABETUR.

(Lecture given at London Institution, continued, with added Illustrations.)

1. Of course—we all know what flowing means. Well, it is to be hoped so; but I'm not sure. Let us see. The sand of the hour-glass,—do you call the motion of that flowing?

No. It is only a consistent and measured fall of many unattached particles.

Or do you call the entrance of a gas through an aperture, out of a full vessel into an empty one, flowing?

No. That is expansion—not flux.

Or the draught through the keyhole? No—is your answer, still. Let us take instance in water itself. The *spring* of a fountain, or of a sea breaker into spray. You don't call that flowing?

No.

Nor the *fall* of a fountain, or of rain?

No.

Well, the *rising* of a breaker,—the current of water in the hollow shell of it,—is *that* flowing? No. After it has

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broken—rushing up over the shingle, or impatiently advancing on the sand? You begin to pause in your negative.

Drooping back from the shingle then, or ebbing from the sand? Yes; flowing, in some places, certainly, now.

You see how strict and distinct the idea is in our minds. Will you accept—I think you may,—this definition of it? Flowing is “the motion of liquid or viscous matter over solid matter, under the action of gravity, without any other impelling force.”

2. Will you accuse me, in pressing this definition on you, of wasting time in mere philological nicety? Permit me, in the capacity which even the newspapers allow to me,—that of a teacher of expression,—to answer you, as often before now, that philological nicety is philosophical nicety. See the importance of it here. I said a glacier flowed. But it remains a question whether it does not also *spring*,—whether it can rise as a fountain, no less than descend as a stream.

For, broadly, there are two methods in which either a stream or glacier moves.

The first, by withdrawing a part of its mass in front, the vacancy left by which, another part supplies from behind.

That is the method of a continuous stream,—perpetual deduction,* by what precedes, of what follows.

* “Ex quo illa admirabilis a majoribus aquæ facta deductio est.”—Cic. de Div., 1, 44.

The second method of motion is when the mass that is behind, presses, or is poured in upon, the masses before. That is the way in which a cataract falls into a pool, or a fountain into a basin.

Now, in the first case, you have catenary curves, or else curves of traction, going down the stream. In the second case, you have irregularly concentric curves, and ripples of impulse and compression, succeeding each other round the pool.

3. Now the Mer de Glace is deduced down its narrow channel, like a river; and the Glacier des Bossons is deduced down its steep ravine; and both were once injected into a pool of ice in the valley below, as the Glacier of the Rhone is still. Whereupon, observe, if a stream falls into a basin—level-lipped all round—you know when it runs over it must be pushed over—lifted over. But if ice is thrown into a heap in a plain, you can't tell, without the closest observation, how violently it is pushed from behind, or how softly it is diffusing itself in front; and I had never set my eyes or wits to ascertain where compression in the mass ceased, and diffusion began, because I thought Forbes had done everything that had to be done in the matter. But in going over his work again I find he has left just one thing to be still explained; and that one chance to be left to me to show you this evening, because, by a singular and splendid Nemesis, in the obstinate rejection of Forbes's former conclusively simple experiments, and in the endeavour to substitute others of his own, Pro-

fessor Tyndall has confused himself to the extreme point of not distinguishing these two conditions of deductive and impulsive flux. His incapacity of drawing, and ignorance of perspective, prevented him from constructing his diagrams either clearly enough to show him his own mistakes, or prettily enough to direct the attention of his friends to them ;—and they luckily remain to us, in their absurd immortality.

4. Forbes poured viscous substance in layers down a trough ; let the stream harden ; cut it into as many sections as were required ; and showed, in permanence, the actual conditions of such viscous motion. Eager to efface the memory of these conclusive experiments, Professor Tyndall ('Glaciers of the Alps,' page 383) substituted this literally 'superficial' one of his own. He stamped circles on the top of a viscous current ; found, as it flowed, that they were drawn into ovals ; but had not wit to consider, or sense to see, whether the area of the circle was enlarged or diminished—or neither—during its change in shape. He jumped, like the rawest schoolboy, to the conclusion that a circle, becoming an oval, must necessarily be compressed ! You don't compress a globe of glass when you blow it into a soda-water bottle, do you ?

5. But to reduce Professor Tyndall's problem into terms. Let A F, Fig. 3 (page 54), be the side of a stream of any substance whatever, and $a f$ the middle of it ; and let the particles at the middle move twice as fast as


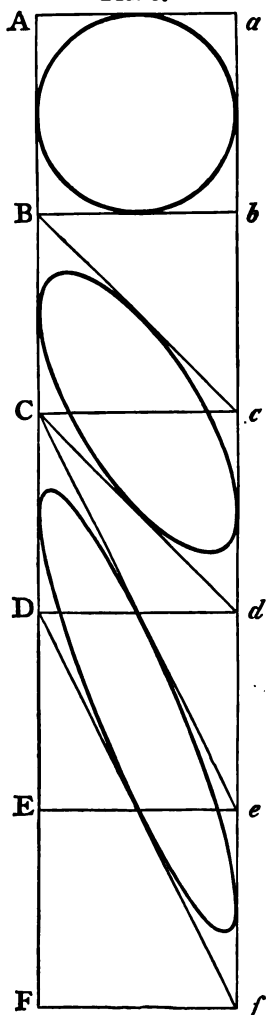


FIG. 3.



the particles at the sides. Now we cannot study all the phenomena of fluid motion in one diagram, nor any one phenomenon of fluid motion but by progressive diagrams; and this first one only shows the changes of form which would take place in a substance which moved with *uniform* increase of rapidity from side to centre. No fluid substance *would* so move; but you can only trace the geometrical facts step by step, from uniform increase to accelerated increase. Let the increase of rapidity, therefore, first be supposed uniform. Then, while the point A moves to B, the point *a* moves to *c*, and any points once intermediate in a right line between A and *a*, will now be intermediate in a right line between B and *c*, and their places determinable by verticals from each to each.

I need not be tedious in farther describing the figure. Suppose A *b* a square mile of the sub-

stance, and the origin of motion on the line A *a*. Then when the point A has arrived at B, the point B has arrived at C, the point *a* at *c*, and the point *b* at *d*, and the mile square, A *b*, has become the mile rhombic, B *d*, of the same area; and if there were a circle drawn in the square A *b*, it will become the fat ellipse in B *d*, and thin ellipse in C *f*, successively.

6. Compressed, thinks Professor Tyndall, one way, and stretched the other!

But the Professor has never so much as understood what 'stretching' means. He thinks that ice won't stretch! Does he suppose treacle, or oil, *will*? The brilliant natural philosopher has actually, all through his two books on glaciers, confused viscosity with elasticity! You can *stretch* a piece of Indian-rubber, but you can only *diffuse* treacle, or oil, or water.

"But you can draw these out into a narrow stream, whereas you cannot pull the ice?"

No; neither can you pull water, can you? In compressing any substance, you can apply any force you like; but in extending it, you can only apply force less than that with which its particles cohere. You can pull honey into a thin string, when it comes out of the comb; let it be candied, and you can't pull it into a thin string. Does that make it less a viscous substance? You can't stretch mortar either. It cracks even in the hod, as it is heaped. Is it, therefore, less fluent or manageable in the mass?

7. Whereas the curious fact of the matter is, that, in

precise contrariety to Mr. Tyndall's idea, ice, (glacier ice, that is to say,) *will* stretch; and that treacle or water won't! and that's just the plague of dealing with the whole glacier question—that the incomprehensible, untenable, indescribable ice will both squeeze and open; and is slipping through your fingers all the time besides, by melting away. You can't deal with it as a simple fluid; and still less as a simple solid. And instead of having less power to accommodate itself to the irregularities of its bed than water, it has much more;—a great deal more of it will subside into a deep place, and ever so much of it melt in passing over a shallow one; and the centre, at whatever rate it moves, will supply itself by the exhaustion of the sides, instead of raging round, like a stream in back-water.

8. However, somehow, I must contrive to deal at least with the sure fact that the velocity of it is progressively greater from the sides to the centre, and from the bottom to the surface.

Now it is the last of these progressive increments which is of chief importance to my present purpose.

For my own conviction on the matter;—mind, not *theory*, for a man can always avoid constructing theories, but cannot possibly help his convictions, and may sometimes feel it right to state them,—my own conviction is that the ice, when it is of any considerable depth, no more moves over the bottom than the lower particles of a running stream of honey or treacle move over a plate

but that, in entire rest at the bottom, except so far as it is moved by dissolution, it increases in velocity to the surface in a curve of the nature of a parabola, or a logarithmic curve, capable of being infinitely prolonged, on the supposition of the depth of the ice increasing to infinity.

9. But it is now my fixed principle not to care what I think, when a fact can be ascertained by looking, or measuring. So, not having any observations of my own on this matter, I seek what help may be had elsewhere ; and find in the eleventh chapter of Professor Tyndall's 'Glaciers of the Alps,' two most valuable observations, made under circumstances of considerable danger, calmly encountered by the author, and grumblingly by his guide,—danger consisting in the exposure to a somewhat close and well-supported fire of round and grape from the glacier of the Géant, which objected to having its velocity measured. But I find the relation of these adventures so much distract me from the matter in hand, that I must digress briefly into some notice of the general literary structure of this remarkable book.

10. Professor Tyndall never fails to observe with complacency, and to describe to his approving readers, how unclouded the luminous harmonies of his reason, imagination, and fancy remained, under conditions which, he rightly concludes, would have been disagreeably exciting, or even distinctly disturbing, to less courageous persons. And indeed I confess, for my own part, that my success-

fullest observations have always been made while lying all my length on the softest grass I could find ; and after assuring myself with extreme caution that if I chanced to go to sleep, (which in the process of very profound observations I usually do, at least of an afternoon,) I am in no conceivable peril beyond that of an ant-bite. Nevertheless, the heroic Professor does not, it seems to me, sufficiently recognize the universality of the power of English, French, German, and Italian gentlemen to retain their mental faculties under circumstances even of more serious danger than the crumbling of a glacier moraine ; and to think with quickness and precision, when the chances of death preponderate considerably, or even conclusively, over those of life. Nor does Professor Tyndall seem to have observed that the gentlemen possessing this very admirable power in any high degree, do not usually think their own emotions, or absence of emotions, proper subjects of printed history, and public demonstration.

11. Nevertheless, when a national philosopher, under showers of granite grape, places a stake and auger against his heart, buttons his coat upon them, and cuts himself an oblique staircase up a wall of ice, nearly vertical, to a height of forty feet from the bottom ; and there, unbuttoning his coat, pierces the ice with his auger, drives in his stake, and descends without injury, though during the whole operation his guide "growls audibly," we are bound to admit his claim to a scientific Victoria Cross—or at least crosslet,—and even his right to walk about in our


London drawing-rooms in a gracefully cruciferous costume; while I have no doubt also that many of his friends will be interested in such metaphysical particulars and examples of serene mental analysis as he may choose to give them in the course of his autobiography. But the Professor ought more clearly to understand that scientific writing is one thing, and pleasant autobiography another; and though an officer may not be able to give an account of a battle without involving some statement of his personal share in it, a scientific observer might with entire ease, and much convenience to the public, have published 'The Glaciers of the Alps' in two coincident, but not coalescing, branches—like the glaciers of the Giant and Léchaud; and that out of the present inch and a half thickness of the volume, an inch and a quarter might at once have been dedicated to the Giant glacier of the autobiography, and the remaining quarter of an inch to the minor current of scientific observation, which, like the Glacier de Léchaud, appears to be characterized by "the comparative shallowness of the upper portion," * and by its final reduction to "a dribblet measuring about one-tenth of its former transverse dimensions."

12. It is true that the book is already divided into two portions,—the one described as "chiefly narrative," and the other as "chiefly scientific." The chiefly narrative portion is, indeed, full of very interesting matter fully jus-

* 'Glaciers of the Alps,' p. 288.

tifying its title; as, for instance, "We tumbled so often in the soft snow, and our clothes and boots were so full of it, that we thought we might as well try the sitting posture in sliding down. We did so, and descended with extraordinary velocity" (p. 116). Or again: "We had some tea, which had been made at the Montanvert, and carried up to the Grand Mulets in a bottle. My memory of that tea is not pleasant" (p. 73). Or in higher strains of scientific wit and pathos: "As I looked at the objects which had now become so familiar to me, I felt that, though not viscous, the ice did not lack the quality of adhesiveness, and I felt a little sad at the prospect of bidding it so soon farewell."

13. But the merely romantic readers of this section, rich though it be in sentiment and adventure, will find themselves every now and then arrested by pools, as it were, of almost impassable scientific depth—such as the description of a rock "evidently to be regarded as an assemblage of magnets, or as a single magnet full of consequent points" (p. 140). While, on the other hand, when in the course of my own work, finding myself pressed for time, and eager to collect every scrap of ascertained data accessible to me, I turn hopefully to the eleventh chapter of the "chiefly scientific" section of the volume, I think it hard upon me that I must read through three pages of narrative describing the Professor's dangers and address, before I can get at the two observations which are the sum of the scientific contents of the chapter, yet to the first of



which "unfortunately some uncertainty attached itself," and the second of which is wanting in precisely the two points which would have made it serviceable. First, it does not give the rate of velocity at the base, but five feet above the base; and, secondly, it gives only three measurements of motion. Had it given four, we could have drawn the curve: but we can draw any curve we like through three points.

14. I will try the three points, however, with the most probable curve; but this being a tedious business, will reserve it for a separate chapter, which readers may skip if they choose: and insert, for the better satisfaction of any who may have been left too doubtful by the abrupt close of my second chapter, this postscript, written the other day after watching the streamlets on the outlying fells of Shap.

15. Think what would be the real result, if any stream among our British hills at this moment *were* cutting its bed deeper.

In order to do so, it must of course annually be able to remove the entire zone of *débris* moved down to its bed from the hills on each side of it—and somewhat more.

Take any Yorkshire or Highland stream you happen to know, for example; and think what quantity of *débris* must be annually moved, on the hill surfaces which feed its waters. Remember that a lamb cannot skip on their slopes, but it stirs with its hoofs some stone or grain of dust which will more or less roll or move downwards.

That no shower of rain can fall—no wreath of snow melt, without moving some quantity of dust downwards. And that no frost can break up, without materially loosening some vast ledges of crag, and innumerable minor ones; nor without causing the fall of others as vast, or as innumerable. Make now some effort to conceive the quantity of rock and dust moved annually, lower, past any given level traced on the flanks of any considerable mountain stream, over the area it drains—say, for example, in the basin of the Ken above Kendal, or of the Wharfe above Bolton Abbey.

16. Then, if either of those streams were cutting their beds deeper,—that quantity of rock, and something more, must be annually carried down by their force, past Kendal bridge, and Bolton stepping-stones. Which you will find would occasion phenomena very astonishing indeed to the good people of Kendal and Wharfedale.

17. “But it need not be carried down past the stepping-stones,” you say—“it may be deposited somewhere above.” Yes, that is precisely so;—and wherever it *is* deposited, the bed of the stream, or of some tributary streamlet, is being raised. Nobody notices the raising of it;—another stone or two among the wide shingle—a tongue of sand an inch or two broader at the burnside—who can notice that? Four or five years pass;—a flood comes;—and Farmer So-and-So’s field is covered with slimy ruin. And Farmer So-and-So’s field is an inch higher than it was, for evermore—but who notices that? The shingly stream has

gone back into its bed : here and there a whiter stone or two gleams among its pebbles, but next year the water stain has darkened them like the rest, and the bed is just as far below the level of the field as it was. And your careless geologist says, ' what a powerful stream it is, and how deeply it is cutting its bed through the glen ! '

18. Now, carry out this principle for existing glaciers. If the glaciers of Chamouni were cutting their beds deeper, either the annual line of débris of the Mont Blanc range on its north side must be annually carried down past the Pont Pelissier ; or the valley of Chamouni must be in process of filling up, while the ravines at its sides are being cut down deeper. Will any geologist, supporting the modern glacial theories, venture to send me, for the next number of *Deucalion*, his idea, on this latter, by him inevitable, hypothesis, of the profile of the bottom of the Glacier des Bossons, a thousand years ago ; and a thousand years hence ?

CHAPTER V.

THE VALLEY OF CLUSE.

1. WHAT strength of faith men have in each other ; and how impossible it is for them to be independent in thought, however hard they try ! Not that they ever ought to be ; but they should know, better than they do, the incumbrance that the false notions of others are to them.

Touching this matter of glacial grinding action ; you will find every recent writer taking up, without so much as a thought of questioning it, the notion adopted at first careless sight of a glacier stream by some dull predecessor of all practical investigation—that the milky colour of it is all produced by dust ground off the rocks at the bottom. And it never seems to occur to any one of the Alpine Club men, who are boasting perpetually of their dangers from falling stones ; nor even to professors impeded in their most important observations by steady fire of granite grape, that falling stones may probably knock their edges off when they strike ; and that moving banks and fields of moraine, leagues long, and leagues square, of which every stone is shifted a foot forward every day on a surface melting beneath them, must in such shifting be liable to attrition enough to produce considerably more dust, and

that of the finest kind, than any glacier stream carries down with it—not to speak of processes of decomposition accelerated, on all surfaces liable to them, by alternate action of frost and fierce sunshine.

2. But I have not, as yet, seen any attempts to determine even the first data on which the question of attrition must be dealt with. I put it, in simplicity, at the close of last chapter. But, in its full extent, the inquiry ought not to be made merely of the bed of the Glacier des Bossons; but of the bed of the Arve, from the Col de Balme to Geneva; in which the really important points for study are the action of its waters at Pont Pelissier;—at the falls below Servoz;—at the portal of Cluse;—and at the northern end of the slope of the Salève.

3. For these four points are the places where, if at all, sculptural action is really going on upon its bed: at those points, if at all, the power of the Second *Æra*, the *æra* of sculpture, is still prolonged into this human day of ours. As also it is at the rapids and falls of all swiftly descending rivers. The one vulgar and vast deception of Niagara has blinded the entire race of modern geologists to the primal truth of mountain form, namely, that the rapids and cascades of their streams indicate, not points to which the falls have receded, but places where the remains of once colossal cataracts still exist, at the places eternally (in human experience) appointed for the formation of such cataracts, by the form and hardness of the local rocks. The rapids of the Amazon, the Nile, and the Rhine, obey

precisely the same law as the little Wharfe at its Strid, or as the narrow 'rivus aquæ' which, under a bank of strawberries in my own tiny garden, has given me perpetual trouble to clear its channel of the stones brought down in flood, while, just above, its place of picturesque cascade, is determined for it by a harder bed of Coniston flags, and the little pool, below that cascade, never encumbered with stones at all.

4. Now the bed of the Arve, from the crest of the Col de Balme to Geneva, has a fall of about 5,000 feet ; and if any young Oxford member of the Alpine Club is minded to do a piece of work this vacation, which in his old age, when he comes to take stock of himself, and edit the fragments of himself, as I am now sorrowfully doing, he will be glad to have done, (even though he risked neither his own nor any one else's life to do it,) let him survey that bed accurately, and give a profile of it, with the places and natures of emergent rocks, and the ascertainable depths and dates of alluvium cut through, or in course of deposition.

5. After doing this piece of work carefully, he will probably find some valuable ideas in his head concerning the proportion of the existing stream of the Arve to that which once flowed from the glacier which deposited the moraine of Les Tines ; and again, of that torrent to the infinitely vaster one of the glacier that deposited the great moraine of St. Gervais ; and finally of both, to the cliffs of Cluse, which have despised and resisted them. And ideas

which, after good practical work, he finds in his head, are likely to be good for something : but he must not seek for them ; all thoughts worth having come like sunshine, whether we will or no : the thoughts not worth having, are the little lucifer matches we strike ourselves.

6. And I hasten the publication of this number of Deucalion, to advise any reader who cares for the dreary counsel of an old-fashioned Alpine traveller, to see the valley of Cluse this autumn, if he may, rather than any other scene among the Alps ;—for if not already destroyed, it must be so, in a few months more, by the railway which is to be constructed through it, for the transport of European human diluvium. The following note of my last walk there, written for my autumn lectures, may be worth preserving among the shingle of my scattered work.

7. I had been, for six months in Italy, never for a single moment quit of liability to interruption of thought. By day or night, whenever I was awake, in the streets of every city, there were entirely monstrous and inhuman noises in perpetual recurrence. The violent rattle of carriages, driven habitually in brutal and senseless haste, or creaking and thundering under loads too great for their cattle, urged on by perpetual roars and shouts : wild bellowing and howling of obscene wretches far into the night : clashing of church bells, in the morning, dashed into reckless discord, from twenty towers at once, as if rung by devils to defy and destroy the quiet of God's sky,

and mock the laws of His harmony : filthy, stridulous shrieks and squeaks, reaching for miles into the quiet air, from the railroad stations at every gate : and the vociferation, endless, and frantic, of a passing populace whose every word was in mean passion, or in unclean jest. Living in the midst of this, and of vulgar sights more horrible than the sounds, for six months, I found myself—suddenly, as in a dream—walking again alone through the valley of Cluse, unchanged since I knew it first, when I was a boy of fifteen, quite forty years ago ;—and in perfect quiet, and with the priceless completion of quiet, that I was without fear of any outcry or base disturbance of it.

8. But presently, as I walked, the calm was deepened, instead of interrupted, by a murmur—first low, as of bees, and then rising into distinct harmonious chime of deep bells, ringing in true cadences—but I could not tell where. The cliffs on each side of the valley of Cluse vary from 1,500 to above 2,000 feet in height ; and, without absolutely echoing the chime, they so accepted, prolonged, and diffused it, that at first I thought it came from a village high up and far away among the hills ; then presently it came down to me as if from above the cliff under which I was walking ; then I turned about and stood still, wondering ; for the whole valley was filled with the sweet sound, entirely without local or conceivable origin : and only after some twenty minutes' walk, the depth of tones, gradually increasing, showed me that they came from the

tower of Maglans in front of me ; but when I actually got into the village, the cliffs on the other side so took up the ringing, that I again thought for some moments I was wrong.

Perfectly beautiful, all the while, the sound, and exquisitely varied,—from ancient bells of perfect tone and series, rung with decent and joyful art.

“What are the bells ringing so to-day for,—it is no fête?” I asked of a woman who stood watching at a garden gate.

“For a baptism, sir.”


And so I went on, and heard them fading back, and lost among the same bewildering answers of the mountain air.

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10. Of ‘Cluse,’ the closed valley,—not a ravine, but a winding plain, between very great mountains, rising for the most part in cliffs—but cliffs which retire one behind the other above slopes of pasture and forest. (Now as I am writing this passage in a country parsonage—of Cow-

and mock the laws of His harmony : filthy, stridulous shrieks and squeaks, reaching for miles into the quiet air, from the railroad stations at every gate : and the vociferation, endless, and frantic, of a passing populace whose every word was in mean passion, or in unclean jest. Living in the midst of this, and of vulgar sights more horrible than the sounds, for six months, I found myself—suddenly, as in a dream—walking again alone through the valley of Cluse, unchanged since I knew it first, when I was a boy of fifteen, quite forty years ago ;—and in perfect quiet, and with the priceless completion of quiet, that I was without fear of any outcry or base disturbance of it.

8. But presently, as I walked, the calm was deepened, instead of interrupted, by a murmur—first low, as of bees, and then rising into distinct harmonious chime of deep bells, ringing in true cadences—but I could not tell where. The cliffs on each side of the valley of Cluse vary from 1,500 to above 2,000 feet in height ; and, without absolutely echoing the chime, they so accepted, prolonged, and diffused it, that at first I thought it came from a village high up and far away among the hills ; then presently it came down to me as if from above the cliff under which I was walking ; then I turned about and stood still, wondering ; for the whole valley was filled with the sweet sound, entirely without local or conceivable origin : and only after some twenty minutes' walk, the depth of tones, gradually increasing, showed me that they came from the



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10. Of ‘Cluse,’ the closed valley,—not a ravine, but a winding plain, between very great mountains, rising for the most part in cliffs—but cliffs which retire one behind the other above slopes of pasture and forest. (Now as I am writing this passage in a country parsonage—of Cow-

ley, near Uxbridge,—I am first stopped by a railroad whistle two minutes and a half long,* and then by the rumble and grind of a slow train, which prevents me from hearing my own words, or being able to think, so that I must simply wait for ten minutes, till it is past.)

It being past, I can go on. Slopes of pasture and forest, I said, mingled with arable land, in a way which you can only at present see in Savoy; that is to say, you have walnut and fruit trees of great age, mixed with oak, beech, and pine, as they all choose to grow—it seems as if the fruit trees planted themselves as freely as the pines. I imagine this to be the consequence of a cultivation of very ancient date under entirely natural laws; if a plum-tree or a walnut planted itself, it was allowed to grow; if it came in the way of anything or anybody, it would be cut down; but on the whole the trees grew as they liked; and the fields were cultivated round them in such spaces as the rocks left;—ploughed, where the level admitted, with a ploughshare lightly constructed, but so huge that it looks more like the beak of a trireme than a plough, two oxen forcing it to heave aside at least two feet depth of the light earth;—no fences anywhere; winding field walks, or rock paths, from cottage to cottage; these last not of the luxurious or trim Bernese type, nor yet comfortable chalets; but sufficient for orderly and virtuous life: in outer aspect, beautiful exceedingly, just because

* Counted by watch, for I knew by its manner it would last, and measured it.

their steep roofs, white walls, and wandering vines had no pretence to perfectness, but were wild as their hills. All this pastoral country lapped into inlets among the cliffs, vast belts of larch and pine cresting or clouding the higher ranges, whose green meadows change as they rise, into mossy slopes, and fade away at last among the grey ridges of rock that are soonest silvered with autumnal snow.

11. The ten-miles length of this valley, between Cluse and St. Martin's, include more scenes of pastoral beauty and mountain power than all the poets of the world have imagined ; and present more decisive and trenchant questions respecting mountain structure than all the philosophers of the world could answer : yet the only object which occupies the mind of the European travelling public, respecting it, is to get through it, if possible, under the hour.

12. I spoke with sorrow, deeper than my words attempted to express, in my first lecture, of the blind rushing of our best youth through the noblest scenery of the Alps, without once glancing at it, that they might amuse, or kill, themselves on their snow. That the claims of all sweet pastoral beauty, of all pious domestic life, for a moment's pause of admiration or sympathy, should be unfelt, in the zest and sparkle of boy's vanity in summer play, may be natural at all times ; and inevitable while our youth remain ignorant of art, and defiant of religion ; but that, in the present state of science, when every eye

is busied with the fires in the Moon and the shadows in the Sun, no eye should occupy itself with the ravines of its own world, nor with the shadows which the sun casts on the cliffs of them ; that the simplest,—I do not say problems, but bare facts, of structure,—should still be unrepresented, and the outmost difficulties of rock history untouched ; while dispute, and babble, idler than the chafed pebbles of the wavering beach, clink, jar, and jangle on from year to year in vain,—surely this, in our great University, I am bound to declare to be blameful ; and to ask you, with more than an artist's wonder, why this fair valley of Cluse is now closed indeed, and forsaken, “ clasped like a missal shut where Paynims pray ; ” and, with all an honest inquirer's indignation, to challenge—in the presence of our Master of Geology, happily one of its faithful and true teachers,* the Speakers concerning the Earth,—the geologists, not of England only, but of Europe and America,—either to explain to you the structure or sculpture of this † renownedest cliff in all the Alps, under which Tell leaped ashore ; or to assign valid reason for the veins in the pebbles which every Scotch lassie wears for her common jewellery.

* Mr. Prestwich. I have to acknowledge, with too late and vain gratitude, the kindness and constancy of the assistance given me, on all occasions when I asked it, by his lamented predecessor in the Oxford Professorship of Geology, Mr. Phillips.

† The cliff between Fluelen and Brunnen, on the lake of Uri, of which Turner's drawing was exhibited at this lecture.

CHAPTER VI.

OF BUTTER AND HONEY.

1. THE last chapter, being properly only a continuation of the postscript to the fourth, has delayed me so long from my question as to ice-curves, that I cannot get room for the needful diagrams and text in this number ; which is perhaps fortunate, for I believe it will be better first to explain to the reader more fully why the ascertainment of this curve of vertical motion is so desirable.

To which explanation, very clear definition of some carelessly used terms will be essential.

2. The extremely scientific Professor Tyndall always uses the terms Plastic, and Viscous, as if they were synonymous. But they express entirely different conditions of matter. The first is the term proper to be used of the state of butter, on which you can stamp whatever you choose ; and the stamp will stay ; the second expresses that of honey, on which you can indeed stamp what you choose ; but the stamp melts away forthwith.

And of viscosity itself there are two distinct varieties—one glutinous, or gelatinous, like that of treacle or tapioca soup ; and the other simply adhesive, like that of mercury or melted lead.

And of both plasticity and viscosity there are infinitely various degrees in different substances, from the perfect and absolute plasticity of gold, to the fragile, and imperfect, but to man more precious than any quality of gold, plasticity of clay, and, most precious of all, the blunt and dull plasticity of dough; and again, from the vigorous and binding viscosity of stiff glue, to the softening viscosity of oil, and tender viscosity of old wine. I am obliged therefore to ask my readers to learn, and observe very carefully in our future work, these following definitions.

Plastic.—Capable of change of form under external force, without any loss of continuity of substance; and of *retaining afterwards the form imposed on it*.

Gold is the most perfectly plastic substance we commonly know; clay, butter, etc., being more coarsely and ruggedly plastic, and only in certain consistencies or at certain temperatures.

Viscous.—Capable of change of form under external force, *but not of retaining the form imposed*; being languidly obedient to the force of gravity, and necessarily declining to the lowest possible level,—as lava, treacle, or honey.

Ductile.—Capable of being extended by traction without loss of continuity of substance. Gold is both plastic and ductile; but clay, plastic only, not ductile; while most melted metals are ductile only, but not plastic.

Malleable.—Plastic only under considerable force.

3. We must never let any of these words entangle, as necessary, the idea belonging to another.

A plastic substance is not necessarily ductile, though gold is both; a viscous substance is not necessarily ductile, though treacle is both; and the quality of elasticity, though practically inconsistent with the character either of a plastic body, or a viscous one, may enter both the one and the other as a gradually superadded or interfering condition, in certain states of congelation; as in indian-rubber, glass, sealing-wax, asphalt, or basalt.

I think the number of substances I have named in this last sentence, and the number of entirely different states which in an instant will suggest themselves to you, as characteristic of each, at, and above, its freezing or solidifying point, may show at once how careful we should be in defining the notion attached to the words we use; and how inadequate, without specific limitation and qualification, *any* word must be, to express all the qualities of any given substance.

4. But, above all substances that can be proposed for definition of quality, glacier ice is the most defeating. For it is practically plastic; but *actually* viscous;—and that to the full extent. You can beat or hammer it, like gold; and it will stay in the form you have beaten it into, for a time;—and so long a time, that, on all instant occasions of plasticity, it is practically plastic. But only have patience to wait long enough, and it will run down out of the form you have stamped on it, as honey does,

so that, actually and inherently, it is viscous, and not plastic.

5. Here then, at last, I have got Forbes's discovery and assertion put into accurately intelligible terms;—very incredible terms, I doubt not, to most readers.

There is not the smallest hurry, however, needful in believing them: only let us understand clearly what it is we either believe or deny; and in the meantime, return to our progressive conditions of snow on the simplest supposable terms, as shown in my first plate.

6. On a conical mountain, such as that represented in Fig. 6, we are embarrassed by having to calculate the subtraction by avalanche down the slopes. Let us therefore take rather, for examination, a place where the snow can lie quiet.

Let Fig. 7, Plate I., represent a hollow in rocks at the summit of a mountain above the line of perpetual snow, the lowest watershed being at the level indicated by the dotted line. Then the snow, once fallen in this hollow, can't get out again; but a little of it is taken away every year, partly by the heat of the ground below, partly by surface sunshine and evaporation, partly by filtration of water from above, while it is also saturated with water in thaw-time, up to the level of watershed. Consequently it must subside every year in the middle; and, as the mass remains unchanged, the same quantity must be added every year at the top,—the excess being always, of course, blown away, or dropped off, or thawed above, in the year it falls.

7. Hence the entire mass will be composed, at any given time, of a series of beds somewhat in the arrangement given in Fig. 8; more remaining of each year's snow in proportion to its youth, and very little indeed of the lowest and oldest bed.

It *must* subside, I say, every year;—but how much is involved, of new condition, in saying this! Take the question in the simplest possible terms; and let Fig. 9 represent a cup or crater full of snow, level in its surface at the end of winter. During the summer, there will be large superficial melting; considerable lateral melting by reverberation from rock, and lateral drainage; bottom melting from ground heat, not more than a quarter of an inch,—(Forbes's Travels, page 364,)—a quantity which we may practically ignore. Thus the mass, supposing the substance of it immovable in position, would be reduced by *superficial* melting during the year to the form approximately traced by the dotted line within it, in Fig. 9.

8. But how of the *interior* melting? Every interstice and fissure in the snow, during summer, is filled either with warm air, or warm water in circulation through it, and every separate surface of crystal is undergoing its own degree of diminution. And a constant change in the conditions of equilibrium results on every particle of the mass; and a constant subsidence takes place, involving an entirely different relative position of every portion of it at the end of the year.

9. But I cannot, under any simple geometrical figure,

give an approximation to the resultant directions of change in form ; because the density of the snow must be in some degree proportioned to the depth, and the melting less, in proportion to the density.

Only at all events, towards the close of the year, the mass enclosed by the dotted line in Fig. 9 will have sunk into some accommodation of itself to the hollow bottom of the crater, as represented by the continuous line in Fig. 10. And, over that, the next winter will again heap the snow to the cup-brim, to be reduced in the following summer ; but now through two different states of consistence, to the bulk limited by the dotted line in Fig. 10.

10. In a sequence of six years, therefore, we shall have a series of beds approximately such as in Fig. 11 ;—approximately observe, I say always, being myself wholly unable to deal with the complexities of the question, and only giving the diagram for simplest basis of future investigation, by the first man of mathematical knowledge and practical common sense, who will leave off labouring for the contradiction of his neighbours, and apply himself to the hitherto despised toil of the ascertainment of facts. And when he has determined what the positions of the strata will be in a perfectly uniform cup, such as that of which the half is represented in perspective in Fig. 12, let him next inquire what would have happened to the mass, if, instead of being deposited in a cup enclosed, on all sides, it had been deposited in an amphitheatre open on one, as in the section shown in Fig. 12. For that is indeed the first radical problem to be determined respecting glacier motion.

Difficult enough, if approached even with a clear head, and open heart ; acceptant of all help from former observers, and of all hints from nature and heaven ; but very totally insoluble, when approached by men whose poor capacities for original thought are unsteadied by conceit, and paralyzed by envy.

11. In my second plate, I have given, side by side, a reduction, to half-scale, of part of Forbes's exquisite chart of the Mer de Glace, published in 1845, from his own survey made in 1842 ; and a reproduction, approximately in facsimile, of Professor Tyndall's woodcut, from his own 'eye-sketch' of the same portion of the glacier "as seen from the cleft station, Trélaporte," published in 1860.*

That Professor Tyndall is unable to draw anything as seen from anywhere, I observe to be a matter of much self-congratulation to him ; such inability serving farther to establish the sense of his proud position as a man of science, above us poor artists, who labour under the disadvantage of being able with some accuracy to see, and with some fidelity to represent, what we wish to talk about. But when he found himself so resplendently inartistic, in the eye-sketch in question, that the expression of his scientific vision became, for less scientific persons, only a very bad

* 'Glaciers of the Alps,' p. 369. Observe also that my engraving, in consequence of the reduced scale, is grievously inferior to Forbes's work ; but quite effectually and satisfactorily reproduces Professor Tyndall's, of the same size as the original.

map, it was at least incumbent on his **Royally-social** Eminence to ascertain whether any better map of the same places had been published before. And it is indeed clear, in other places of his book, that he **was** conscious of the existence of Forbes's chart; but did not care to refer to it on this occasion, because it contained the correction of a mistake made by Forbes in 1842, which Professor Tyndall wanted, himself, to have the credit of correcting; leaving the public at the same time to suppose it had never been corrected by its author.

12. This manner, and temper, of reticence, with its relative personal loquacity, is not one in which noble science can be advanced; or in which even petty science can be increased. Had Professor Tyndall, instead of seeking renown by the exposition of Forbes's few and minute mistakes, availed himself modestly of Forbes's many and great discoveries, ten years of arrest by futile discussion and foolish speculation might have been avoided in the annals of geology; and assuredly it would not have been left for a despised artist to point out to you, this evening, the one circumstance of importance in glacier structure which Forbes has not explained.

13. You may perhaps have heard I have been founding my artistic instructions lately on the delineation of a jam-pot. Delighted by the appearance of that instructive object, in the Hotel du Mont Blanc, at St. Martin's, full of Chamouni honey, of last year, stiff and white, I found it also gave me command of the best pos-

sible material for examination of glacial action on a small scale.

Pouring a little of its candied contents out upon my plate, by various tilting of which I could obtain any rate of motion I wished to observe in the viscous stream ; and encumbering the sides and centre of the said stream with magnificent moraines composed of crumbs of toast, I was able, looking alternately to table and window, to compare the visible motion of the mellifluous glacier, and its transported toast, with the less traceable, but equally constant, motion of the glacier of Bionnassay, and its transported granite. And I thus arrived at the perception of the condition of glacial structure, which though, as I told you just now, not, I believe, hitherto illustrated, it is entirely in your power to illustrate for yourselves in the following manner.

If you will open a fresh pot of honey to-morrow at breakfast, and take out a good table-spoonful of it, you will see, of course, the surface generally ebb in the pot. Put the table-spoonful back in a lump at one side, and you will see the surface generally flow in the pot. The lump you have put on at the side does not diffuse itself over the rest ; but it sinks into the rest, and the entire surface rises round it, to its former level.

Precisely in like manner, every pound of snow you put on the top of Mont Blanc, eventually makes the surface of the glaciers rise at the bottom.*

* Practically hyperbolic expression, but mathematically true.

15. That is not impulsive action, mind you. That is mere and pure viscous action—the communication of force equally in every direction among slowly moving particles. I once thought that this force might also be partially elastic, so that whereas, however vast a mass of honey you had to deal with,—a Niagara of honey,—you never could get it to leap like a sea-wave at rocks, ice might yet, in its fluency, retain this power of leaping; only slowly,—taking a long time to rise, yet obeying the same mathematic law of impulse as a sea-breaker; but ascending through æras of surge, and communicating, through æras, its recoil. The little ripple of the stream breaks on the shore,—quick, quick, quick. The Atlantic wave slowly uplifts itself to its plunge, and slowly appeases its thunder. The ice wave—if there be one—would be to the Atlantic wave as the ocean is to the brook.

If there be one! The question is of immense—of vital—importance, to that of glacier action on crag: but, before attacking it, we need to know what the lines of motion are,—first, in a subsiding table-spoonful of honey; secondly, in an uprearing Atlantic wave; and, thirdly, in the pulsatory festoons of a descending cataract, obtained by the *relaxation* of its mass, while the same pulsatory action is displayed, as unaccountably, by a glacier cataract,* in the *compression* of its mass.

* Or a stick of sealing-wax. Warm one at the fire slowly through; and bend it into the form of a horseshoe. You will then see, through

And, on applying to learned men in Oxford and Cambridge * for elucidation of these modes of motion, I find that, while they can tell me everything I don't want to know, about the collision and destruction of planets, they are not entirely clear on the subject either of the diffusion of a drop of honey from its comb, or the confusion of a rivulet among its cresses. Of which difficult matters, I will therefore reserve inquiry to another chapter; anticipating, however, its conclusions, for the reader's better convenience, by the brief statement, that glacier ice has no power of springing whatever;—that it cannot descend into a rock-hollow, and sweep out the bottom of it, as a cascade or a wave can; but must always sluggishly fill it to the brim before flowing over; and accumulate, beneath, under dead ice, quiet as the depths of a mountain tarn, the fallen ruins of its colossal shore.

a lens of moderate power, the most exquisite facsimiles of glacier fissure produced by extension, on its convex surface, and as faithful image of glacier surge produced by compression, on its concave one.

In the course of such extension, the substance of the ice is actually expanded, (see above, Chap. IV., § 7,) by the widening of every minute fissure; and in the course of such compression, reduced to apparently solid ice, by their closing. The experiments both of Forbes and Agassiz appear to indicate that the original fissures are never wholly effaced by compression; but I do not myself know how far the supposed result of these experiments may be consistent with ascertained phenomena of regelation.

* I have received opportune and kind help, from the other side of the Atlantic waves, in a study of them by my friend Professor Rood.





MORNINGS IN FLORENCE:

BEING

SIMPLE STUDIES

OF

CHRISTIAN ART,

FOR ENGLISH TRAVELLERS.

28703

BY

JOHN RUSKIN, LL.D.,

HONORARY STUDENT OF CHRIST CHURCH, AND SLADE PROFESSOR OF
FINE ART, OXFORD.

III.

BEFORE THE SOLDAN.



NEW YORK:
JOHN WILEY & SON,
15 ASTOR PLACE.
1875.

yesterday. Many a morn and eve have passed since it began — and now — is this to be the ending day of it? And if this — by what manner of end?

That is what Sandro's Fortitude is thinking. And the playing fingers about the sword-hilt would fain let it fall, if it might be: and yet, how swiftly and gladly will they close on it, when the far-off trumpet blows, which she will hear through all her reverie!

There is yet another picture of Sandro's here, which you must look at before going back to Giotto: the small Judith in the room next the Tribune, as you return from this outer one. It is just under Lionardo's Medusa. She is returning to the camp of her Israel, followed by her maid carrying the head of Holofernes. And she walks in one of Botticelli's light dancing actions, her drapery all on flutter, and her hand, like Fortitude's, light on the sword-hilt, but daintily — not nervously, the little finger laid over the cross of it.

And at the first glance — you will think the figure merely a piece of fifteenth-century affectation. 'Judith, indeed! — say rather the daughter of Herodias, at her mincingest.'

Well, yes — Botticelli *is* affected, in the way that all men in that century necessarily were. Much euphuism, much studied grace of manner, much formal assertion of scholarship, mingling with his force of imagination. And he likes twisting the fingers of hands about, just as Correggio does. But he never does it like Correggio, without cause.

Look at Judith again,—at her face, not her drapery,—and remember that when a man is base at the heart, he blights his virtues into weaknesses; but when he is true at the heart, he sanctifies his weaknesses into virtues. It is a weakness of Botticelli's, this love of dancing motion and waved drapery; but why has he given it full flight here?

Do you happen to know anything about Judith yourself, except that she cut off Holofernes' head; and has been made the high light of about a million of vile pictures ever since, in which the painters thought they could surely attract the public to the double show of an execution, and a pretty woman,—especially with the added pleasure of hinting at previously ignoble sin?

When you go home to-day, take the pains to write out for yourself, in the connection I here place them, the verses underneath numbered from the book of Judith; you will probably think of their meaning more carefully as you write.

Begin thus:

"Now at that time, Judith heard thereof, which was the daughter of Merari, * * * the son of Simeon, the son of Israel." And then write out, consecutively, these pieces—

Chapter viii., verses 2 to 8. (Always inclusive,) and read the whole chapter.

Chapter ix., verses 1 and 5 to 7, beginning this piece with the previous sentence, "Oh God, oh my God, hear me also, a widow."

Chapter ix., verses 11 to 14.

„	x.,	„	1 to 5.
„	xiii.,	„	6 to 10.
„	xv.,	„	11 to 13.
„	xvi.,	„	1 to 6.
„	xvi.,	„	11 to 15.
„	xvi.,	„	18 and 19.
„	xvi.,	„	23 to 25.

Now, as in many other cases of noble history, apocryphal and other, I do not in the least care how far the literal facts are true. The conception of facts, and the idea of Jewish womanhood, are there, grand and real as a marble statue,—possession for all ages. And you will feel, after you have read this piece of history, or epic poetry, with honourable care, that there is somewhat more to be thought of and pictured in Judith, than painters have mostly found it in them to show you; that she is not merely the Jewish Dalilah to the Assyrian Samson; but the mightiest, purest, brightest type of high passion in severe womanhood offered to our human memory. Sandro's picture is but slight; but it is true to her, and the only one I know that is; and after writing out these verses, you will see why he gives her that swift, peaceful motion, while you read in her face, only sweet solemnity of dreaming thought. "My people delivered, and by my hand; and God has been gracious to His handmaid!" The triumph of Miriam over a fallen host, the fire of exulting mortal life in an immortal hour, the purity and severity of a guardian angel—all are here; and as her

t follows, carrying indeed the head, but invisible—
 e thing to be carried—no more to be so much as
 at of)—she looks only at her mistress, with intense,
 , watchful love. Faithful, not in these days of fear
 but hitherto in all her life, and afterwards for ever.
 er you have seen it enough, look also for a little
 at Angelico's Marriage and Death of the Virgin, in
 me room; you may afterwards associate the three
 es always together in your mind. And, looking at
 g else to-day in the Uffizii, let us go back to Giotto's
 L

must begin with this work on our left hand, the
 of St. Francis; for it is the key to all the rest. Let
 r first what Mr. Crowe directs us to think of it. "In
 mposition of this scene, Giotto produced a master-
 which served as a model but too often feebly imi-
 by his successors. Good arrangement, variety of
 far and expression in the heads, unity and harmony
 whole, make this an exceptional work of its kind.
 mposition, worthy of the fourteenth century, Ghir-
 o and Benedetto da Majano both imitated, without
 able to improve it. No painter ever produced its
 except Raphael; nor could a better be created except
 far as regards improvement in the mere rendering
 in."

these inspiring observations by the rapturous Crowe,
 cautious Cavalcasella * appends a refrigerating note,

so attribute the wiser note to Signor Cavalcasella because
 , reason to put real confidence in his judgment. But it was

saying "The St. Francis in the glory is new, but the angels are in part preserved. The rest has all been more or less retouched; and no judgment can be given as to the colour of this—or any other (!)—of these works."

You are, therefore—instructed reader—called upon to admire a piece of art which no painter ever produced the equal of except Raphael; but it is unhappily deficient, according to Crowe, in the "mere rendering of form"; and, according to Signor Cavalcasella, "no opinion can be given as to its colour."

Warned thus of the extensive places where the ice is dangerous, and forbidden to look here either for form or colour, you are to admire "the variety of character and expression in the heads." I do not myself know how these are to be given without form or colour; but there appears to me, in my innocence, to be only one head in the whole picture, drawn up and down in different positions.

The "unity and harmony" of the whole—which make this an exceptional work of its kind—mean, I suppose, its general look of having been painted out of a scavenger's cart; and so we are reduced to the last article of our creed according to Crowe,—

"In the composition of this scene Giotto produced a masterpiece."

Well, possibly. The question is, What you mean by 'composition.' Which, putting modern criticism now out

impossible for any man engaged as he is, to go over all the ground covered by so extensive a piece of critical work as these three volumes contain, with effective attention.

of our way, I will ask the reader to think, in front of this wreck of Giotto, with some care.

Was it, in the first place, to Giotto, think you, the "composition of a scene," or the conception of a fact? You probably, if a fashionable person, have seen the apotheosis of Margaret in Faust? You know what care is taken, nightly, in the composition of that scene,—how the draperies are arranged for it; the lights turned off, and on; the fiddlestrings taxed for their utmost tenderness; the bassoons exhorted to a grievous solemnity.

You don't believe, however, that any real soul of a Margaret ever appeared to any mortal in that manner?

Here is an apotheosis also. Composed!—yes; figures high on the right and left, low in the middle, etc., etc., etc.

But the important questions seem to me, Was there ever a St. Francis?—*did* he ever receive stigmata?—*did* his soul go up to heaven—did any monk see it rising—and did Giotto mean to tell us so? If you will be good enough to settle these few small points in your mind first, the "composition" will take a wholly different aspect to you, according to your answer.

Nor does it seem doubtful to me what your answer, after investigation made, must be.

There assuredly was a St. Francis, whose life and works you had better study than either to-day's Galignani, or whatever, this year, may supply the place of the Tichborne case, in public interest.

His reception of the stigmata is, perhaps, a marvellous instance of the power of imagination over physical con-

ditions; perhaps an equally marvellous instance of the swift change of metaphor into tradition; but assuredly, and beyond dispute, one of the most influential, significant, and instructive traditions possessed by the Church of Christ. And, that, if ever soul rose to heaven from the dead body, his soul did so rise, is equally sure.

And, finally, Giotto believed that all he was called on to represent, concerning St. Francis, really had taken place, just as surely as you, if you are a Christian, believe that Christ died and rose again; and he represents it with all fidelity and passion: but, as I just now said, he is a man of supreme common sense;—has as much humour and clearness of sight as Chaucer, and as much dislike of falsehood in clergy, or in professedly pious people: and in his gravest moments he will still see and say truly that what is fat, is fat—and what is lean, lean—and what is hollow, empty.

His great point, however, in this fresco, is the assertion of the reality of the stigmata against all question. There is not only one St. Thomas to be convinced; there are five;—one to each wound. Of these, four are intent only on satisfying their curiosity, and are peering or probing; one only kisses the hand he has lifted. The rest of the picture never was much more than a grey drawing of a noble burial service; of all concerned in which, one monk, only, is worthy to see the soul taken up to heaven; and he is evidently just the monk whom nobody in the convent thought anything of. (His face is all repainted; but one can gather this much, or little, out of it, yet.)

Of the composition, or "unity and harmony of the whole," as a burial service, we may better judge after we have looked at the brighter picture of St. Francis's Birth—birth spiritual, that is to say, to his native heaven; the uppermost, namely, of the three subjects on this side of the chapel. It is entirely characteristic of Giotto; much of it by his hand—all of it beautiful. All important matters to be known of Giotto you may know from this fresco.

'But we can't see it, even with our opera-glasses, but all foreshortened and spoiled. What is the use of lecturing us on this?'

That is precisely the first point which is essentially Giottesque in it; its being so out of the way! It is this which makes it a perfect specimen of the master. I will tell you next something about a work of his which you can see perfectly, just behind you on the opposite side of the wall; but that you have half to break your neck to look at this one, is the very first thing I want you to feel.

It is a characteristic—(as far as I know, quite a universal one)—of the greatest masters, that they never expect you to look at them;—seem always rather surprised if you want to; and not overpleased. Tell them you are going to hang their picture at the upper end of the table at the next great City dinner, and that Mr. So and So will make a speech about it; you produce no impression upon them whatever, or an unfavourable one. The chances are ten to one they send you the most rubbishy thing they can

find in their lumber-room. But send for one of them in a hurry, and tell him the rats have gnawed a nasty hole behind the parlour door, and you want it plastered and painted over;—and he does you a masterpiece which the world will peep behind your door to look at for ever.

I have no time to tell you why this is so ; nor do I know why, altogether ; but so it is.

Giotto, then, is sent for, to paint this high chapel : I am not sure if he chose his own subjects from the life of St. Francis : I think so,—but of course can't reason on the guess securely. At all events, he would have much of his own way in the matter.

Now you must observe that painting a Gothic chapel rightly is just the same thing as painting a Greek vase rightly. The chapel is merely the vase turned upside-down, and outside-in. The principles of decoration are exactly the same. Your decoration is to be proportioned to the size of your vase ; to be together delightful when you look at the cup, or chapel, as a whole ; to be various and entertaining when you turn the cup round ; (you turn *yourself* round in the chapel ;) and to bend its heads and necks of figures about, as it best can, over the hollows, and ins and outs, so that anyhow, whether too long or too short—possible or impossible—they may be living, and full of grace. You will also please take it on my word to-day—in another morning walk you shall have proof of it—that Giotto was a pure Etruscan-Greek of the thirteenth century : converted indeed to worship St. Francis instead of Heracles ; but as far as vase-painting goes, pre-

cisely the Etruscan he was before. This is nothing else than a large, beautiful, coloured Etruscan vase you have got, inverted over your heads like a diving-bell.*

Accordingly, after the quatrefoil ornamentation of the top of the bell, you get two spaces at the sides under arches, very difficult to cramp one's picture into, if it is to be a picture only; but entirely provocative of our old Etruscan instinct of ornament. And, spurred by the difficulty, and pleased by the national character of it, we put our best work into these arches, utterly neglectful of the public below,—who will see the white and red and blue spaces, at any rate, which is all they will want to see, thinks Giotto, if he ever looks down from his scaffold.

* I observe that recent criticism is engaged in proving all Etruscan vases to be of late manufacture, in imitation of archaic Greek. And I therefore must briefly anticipate a statement which I shall have to enforce in following letters. Etruscan art remains in its own Italian valleys, of the Arno and upper Tiber, in one unbroken series of work, from the seventh century before Christ, to this hour, when the country white-washer still scratches his plaster in Etruscan patterns. All Florentine work of the finest kind—Luca della Robbia's, Ghiberti's, Donatello's, Filippo Lippi's, Botticelli's, Fra Angelico's—is absolutely pure Etruscan, merely changing its subjects, and representing the Virgin instead of Athena, and Christ instead of Jupiter. Every line of the Florentine chisel in the fifteenth century is based on national principles of art which existed in the seventh century before Christ; and Angelico, in his convent of St. Dominic, at the foot of the hill of Fésolo, is as true an Etruscan as the builder who laid the rude stones of the wall along its crest—of which modern civilization has used the only arch that remained for cheap building stone. Luckily, I sketched it in 1845: but alas, too carelessly,—never conceiving of the brutalities of modern Italy as possible.

Take the highest compartment, then, on the left, looking towards the window. It was wholly impossible to get the arch filled with figures, unless they stood on each other's heads; so Giotto ekes it out with a piece of fine architecture. Raphael, in the Sposalizio, does the same, for pleasure.

Then he puts two dainty little white figures, bending, on each flank, to stop up his corners. But he puts the taller inside on the right, and outside on the left. And he puts his Greek chorus of observant and moralizing persons on each side of his main action.

Then he puts one Choragus—or leader of chorus, supporting the main action—on each side. Then he puts the main action in the middle—which is a quarrel about that white bone of contention in the centre. Choragus on the right, who sees that the bishop is going to have the best of it, backs him serenely. Choragus on the left, who sees that his impetuous friend is going to get the worst of it, is pulling him back, and trying to keep him quiet. The subject of the picture, which, after you are quite sure it is good as a decoration, but not till then, you may be allowed to understand, is the following. One of St. Francis's three great virtues being Obedience, he begins his spiritual life by quarrelling with his father. He, I suppose in modern terms I should say, 'commercially invests' some of his father's goods in charity. His father objects to that investment; on which St. Francis runs away, taking what he can find about the house along with him. His father follows to claim his property, but finds

it is all gone, already; and that St. Francis has made friends with the Bishop of Assisi. His father flies into an indecent passion, and declares he will disinherit him; on which St. Francis then and there takes all his clothes off, throws them frantically in his father's face, and says he has nothing more to do with clothes or father. The good Bishop, in tears of admiration, embraces St. Francis, and covers him with his own mantle.

I have read the picture to you as, if Mr. Spurgeon knew anything about art, Mr. Spurgeon would read it,—that is to say, from the plain, common sense, Protestant side. If you are content with that view of it, you may leave the chapel, and, as far as any study of history is concerned, Florence also; for you can never know anything either about Giotto, or her.

Yet do not be afraid of my re-reading it to you from the mystic, nonsensical, and Papistical side. I am going to read it to you—if after many and many a year of thought, I am able—as Giotto meant it; Giotto being, as far as we know, then the man of strongest brain and hand in Florence; the best friend of the best religious poet of the world; and widely differing, as his friend did also, in his views of the world, from either Mr. Spurgeon, or Pius IX.

The first duty of a child is to obey its father and mother; as the first duty of a citizen to obey the laws of his state. And this duty is so strict that I believe the only limits to it are those fixed by Isaac and Iphigenia. On the other hand, the father and mother have also a

fixed duty to the child—not to provoke it to wrath. I have never heard this text explained to fathers and mothers from the pulpit, which is curious. For it appears to me that God will expect the parents to understand their duty to their children, better even than children can be expected to know their duty to their parents.

But farther. A *child's* duty is to obey its parents. It is never said anywhere in the Bible, and never was yet said in any good or wise book, that a man's, or woman's, is. *When*, precisely, a child becomes a man or a woman, it can no more be said, than when it should first stand on its legs. But a time assuredly comes when it should. In great states, children are always trying to remain children, and the parents wanting to make men and women of them. In vile states, the children are always wanting to be men and women, and the parents to keep them children. It may be—and happy the house in which it is so—that the father's at least equal intellect, and older experience, may remain to the end of his life a law to his children, not of force, but of perfect guidance, with perfect love. Rarely it is so; not often possible. It is as natural for the old to be prejudiced as for the young to be presumptuous; and, in the change of centuries, each generation has something to judge of for itself.

But this scene, on which Giotto has dwelt with so great force, represents, not the child's assertion of his independence, but his adoption of another Father.

You must not confuse the desire of this boy of Assisi to obey God rather than man, with the desire of your young

cockney Hopeful to have a latch-key, and a separate allowance. No point of duty has been more miserably warped and perverted by false priests, in all churches, than this duty of the young to choose whom they will serve. But the duty itself does not the less exist; and if there be any truth in Christianity at all, there will come, for all true disciples, a time when they have to take that saying to heart, "He that loveth father or mother more than me, is not worthy of me."

'*Loveth*'—observe. There is no talk of disobeying fathers or mothers whom you do *not* love, or of running away from a home where you would rather not stay. But to leave the home which is your peace, and to be at enmity with those who are most dear to you,—this, if there be meaning in Christ's words, one day or other will be demanded of His true followers.

And there *is* meaning in Christ's words. Whatever misuse may have been made of them,—whatever false prophets—and Heaven knows there have been many—have called the young children to them, not to bless, but to curse, the assured fact remains, that if you will obey God, there will come a moment when the voice of man will be raised, with all its holiest natural authority, against you. The friend and the wise adviser—the brother and the sister—the father and the master—the entire voice of your prudent and keen-sighted acquaintance—the entire weight of the scornful stupidity of the vulgar world—for *once*, they will be against you, all at one. You have to obey God rather than man. The human race, with

all its wisdom and love, all its indignation and folly, on one side,—God alone on the other. You have to choose.

That is the meaning of St. Francis's renouncing his inheritance; and it is the beginning of Giotto's gospel of Works. Unless this hardest of deeds be done first,—this inheritance of mammon and the world cast away,—all other deeds are useless. You cannot serve, cannot obey, God and mammon. No charities, no obediences, no self-denials, are of any use, while you are still at heart in conformity with the world. You go to church, because the world goes. You keep Sunday, because your neighbours keep it. But you dress ridiculously, because your neighbours ask it; and you dare not do a rough piece of work, because your neighbours despise it. You must renounce your neighbour, in his riches and pride, and remember him in his distress. That is St. Francis's 'disobedience.'

And now you can understand the relation of subjects throughout the chapel, and Giotto's choice of them.

The roof has the symbols of the three virtues of labour—Poverty, Chastity, Obedience.

A. Highest on the left side, looking to the window. The life of St. Francis begins in his renunciation of the world.

B. Highest on the right side. His new life is approved and ordained by the authority of the church.

C. Central on the left side. He preaches to his own disciples.

D. Central on the right side. He preaches to the heathen.

E. Lowest on the left side. His burial.

F. Lowest on the right side. His power after death.


Besides these six subjects, there are, on the sides of the window, the four great Franciscan saints, St. Louis of France, St. Louis of Toulouse, St. Clare, and St. Elizabeth of Hungary.

So that you have in the whole series this much given you to think of : first, the law of St. Francis's conscience ; then, his own adoption of it ; then, the ratification of it by the Christian Church ; then, his preaching it in life ; then, his preaching it in death ; and then, the fruits of it in his disciples.

I have only been able myself to examine, or in any right sense to see, of this code of subjects, the first, second, fourth, and the St. Louis and Elizabeth. I will ask *you* only to look at two more of them, namely, St. Francis before the Soldan, midmost on your right, and St. Louis.

The Soldan, with an ordinary opera-glass, you may see clearly enough ; and I think it will be first well to notice some technical points in it.

If the little virgin on the stairs of the temple reminded you of one composition of Titian's, this Soldan should, I think, remind you of all that is greatest in Titian ; so forcibly, indeed, that for my own part, if I had been told that a careful early fresco by Titian had been recovered in Santa Croce, I could have believed both report and my own eyes, more quickly than I have been able to admit that this is



indeed by Giotto. It is so great that—had its principles been understood—there was in reality nothing more to be taught of art in Italy; nothing to be invented afterwards, except Dutch effects of light.

That there is no 'effect of light' here arrived at, I beg you at once to observe as a most important lesson. The subject is St. Francis challenging the Soldan's Magi,—fire-worshippers—to pass with him through the fire, which is blazing red at his feet. It is so hot that the two Magi on the other side of the throne shield their faces. But it is represented simply as a red mass of writhing forms of flame; and casts no firelight whatever. There is no ruby colour on anybody's nose; there are no black shadows under anybody's chin; there are no Rembrandtesque gradations of gloom, or glitterings of sword-hilt and armour.

Is this ignorance, think you, in Giotto, and pure artlessness? He was now a man in middle life, having passed all his days in painting, and professedly, and almost contentiously, painting things as he saw them. Do you suppose he never saw fire cast firelight?—and he the friend of Dante! who of all poets is the most subtle in his sense of every kind of effect of light—though he has been thought by the public to know that of fire only. Again and again, his ghosts wonder that there is no shadow cast by Dante's body; and is the poet's friend, *because a painter*, likely, therefore, not to have known that mortal substance casts shadow, and terrestrial flame, light? Nay, the passage in the 'Purgatorio' where the shadows from the morning sunshine make the flames redder, reaches the

accuracy of Newtonian science ; and does Giotto, think you, all the while, see nothing of the sort ?

The fact was, he saw light so intensely that he never for an instant thought of painting it. He knew that to paint the sun was as impossible as to stop it ; and he was no trickster, trying to find out ways of seeming to do what he did not. I can paint a rose,—yes ; and I will. I can't paint a red-hot coal ; and I won't try to, nor seem to. This was just as natural and certain a process of thinking with *him*, as the honesty of it, and true science, were impossible to the false painters of the sixteenth century.

Nevertheless, what his art can honestly do to make you feel as much as he wants you to feel, about this fire, he will do ; and that studiously. That the fire be *luminous* or not, is no matter just now. But that the fire is *hot*, he would have you to know. Now, will you notice what colours he has used in the whole picture. First, the blue background, necessary to unite it with the other three subjects, is reduced to the smallest possible space. St. Francis must be in grey, for that is his dress ; also the attendant of one of the Magi is in grey ; but so warm, that, if you saw it by itself, you would call it brown. The shadow behind the throne, which Giotto knows he *can* paint, and therefore does, is grey also. The rest of the picture* in at least six-sevenths of its area—is either crimson, gold, orange, purple, or white, all as warm as Giotto could paint them ; and set off by minute spaces

* The floor has been repainted ; but though its grey is now heavy and cold, it cannot kill the splendour of the rest.

only of intense black,—the Soldan's fillet at the shoulders, his eyes, beard, and the points necessary in the golden pattern behind. And the whole picture is one glow.

A single glance round at the other subjects will convince you of the special character in this; but you will recognize also that the four upper subjects, in which St. Francis's life and zeal are shown, are all in comparatively warm colours, while the two lower ones—of the death, and the visions after it—have been kept as definitely sad and cold.

Necessarily, you might think, being full of monks' dresses. Not so. Was there any need for Giotto to have put the priest at the foot of the dead body, with the black banner stooped over it in the shape of a grave? Might he not, had he chosen, in either fresco, have made the celestial visions brighter? Might not St. Francis have appeared in the centre of a celestial glory to the dreaming Pope, or his soul been seen of the poor monk, rising through more radiant clouds? Look, however, how radiant, in the small space allowed out of the blue, they are in reality. You cannot anywhere see a lovelier piece of Giottesque colour, though here, you have to mourn over the smallness of the piece, and its isolation. For the face of St. Francis himself is repainted, and all the blue sky; but the clouds and four sustaining angels are hardly retouched at all, and their iridescent and exquisitely graceful wings are left with really very tender and delicate care by the restorer of the sky. And no one but Giotto or Turner could have painted them.

For in all his use of opalescent and warm colour, Giotto is exactly like Turner, as, in his swift expressional power, he is like Gainsborough. All the other Italian religious painters work out their expression with toil; he only can give it with a touch. All the other great Italian colourists see only the beauty of colour, but Giotto also its brightness. And none of the others, except Tintoret, understood to the full its symbolic power; but with those—Giotto and Tintoret—there is always, not only a colour harmony, but a colour secret. It is not merely to make the picture glow, but to remind you that St. Francis preaches to a fire-worshipping king, that Giotto covers the wall with purple and scarlet;—and above, in the dispute at Assisi, the angry father is dressed in red, varying like passion; and the robe with which his protector embraces St. Francis, blue, symbolizing the peace of Heaven. Of course certain conventional colours were traditionally employed by all painters; but only Giotto and Tintoret invent a symbolism of their own for every picture. Thus in Tintoret's picture of the fall of the manna, the figure of God the Father is entirely robed in white, contrary to all received custom: in that of Moses striking the rock, it is surrounded by a rainbow. Of Giotto's symbolism in colour at Assisi, I have given account elsewhere.*

You are not to think, therefore, the difference between the colour of the upper and lower frescoes unintentional. The life of St. Francis was always full of joy and triumph. His death, in great suffering, weariness, and extreme

* 'Fors Clavigera' for September, 1874.

humility. The tradition of him reverses that of Elijah: living, he is seen in the chariot of fire; dying, he submits to more than the common sorrow of death.

There is, however, much more than a difference in colour between the upper and lower frescos. There is a difference in manner which I cannot account for; and above all, a very singular difference in skill,—indicating, it seems to me, that the two lower were done long before the others, and afterwards united and harmonized with them. It is of no interest to the general reader to pursue this question; but one point he can notice quickly, that the lower frescos depend much on a mere black or brown outline of the features, while the faces above are evenly and completely painted in the most accomplished Venetian manner:—and another, respecting the management of the draperies, contains much interest for us.

Giotto never succeeded, to the very end of his days, in representing a figure lying down, and at ease. It is one of the most curious points in all his character. Just the thing which he could study from nature without the smallest hindrance, is the thing he never can paint; while subtleties of form and gesture, which depend absolutely on their momentariness, and actions in which no model can stay for an instant, he seizes with infallible accuracy.

Not only has the sleeping Pope, in the right hand lower fresco, his head laid uncomfortably on his pillow, but all the clothes on him are in awkward angles, even Giotto's instinct for lines of drapery failing him altogether when he has to lay it on a reposing figure. But look at the

folds of the Soldan's robe over his knees. None could be more beautiful or right; and it is to me wholly inconceivable that the two paintings should be within even twenty years of each other in date—the skill in the upper one is so supremely greater. We shall find, however, more than mere truth in its casts of drapery, if we examine them.

They are so simply right, in the figure of the Soldan, that we do not think of them;—we see him only, not his dress. But we see dress first, in the figures of the discomfited Magi. Very fully draped personages these, indeed,—with trains, it appears, four yards long, and bearers of them.

The one nearest the Soldan has done his devoir as bravely as he could; would fain go up to the fire, but cannot; is forced to shield his face, though he has not turned back. Giotto gives him full sweeping breadth of fold; what dignity he can;—a man faithful to his profession, at all events.

The next one has no such courage. Collapsed altogether, he has nothing more to say for himself or his creed. Giotto hangs the cloak upon him, in Ghirlandajo's fashion, as from a peg, but with ludicrous narrowness of fold. Literally, he is a 'shut-up' Magnus—closed like a fan. He turns his head away, hopelessly. And the last Magnus shows nothing but his back, disappearing through the door.

Opposed to them, in a modern work, you would have had a St. Francis standing as high as he could in his sandals,

contemptuous, denunciatory; magnificently showing the Magi the door. No such thing, says Giotto. A somewhat mean man; disappointing enough in presence—even in feature; I do not understand his gesture, pointing to his forehead—perhaps meaning, ‘my life, or my head, upon the truth of this.’ The attendant monk behind him is terror-struck; but will follow his master. The dark Moorish servants of the Magi show no emotion—will arrange their masters’ trains as usual, and decorously sustain their retreat.

Lastly, for the Soldan himself. In a modern work, you would assuredly have had him staring at St. Francis with his eyebrows up, or frowning thundrously at his Magi, with them bent as far down as they would go. Neither of these aspects does he bear, according to Giotto. A perfect gentleman and king, he looks on his Magi with quiet eyes of decision; he is much the noblest person in the room—though an infidel, the true hero of the scene, far more than St. Francis. It is evidently the Soldan whom Giotto wants you to think of mainly, in this picture of Christian missionary work.

He does not altogether take the view of the Heathen which you would get in an Exeter Hall meeting. Does not expatiate on their ignorance, their blackness, or their nakedness. Does not at all think of the Florentine Islington and Pentonville, as inhabited by persons in every respect superior to the kings of the East; nor does he imagine every other religion but his own to be log-worship. Probably the people who really worship logs—

whether in Persia or Pentonville—will be left to worship logs to their hearts' content, thinks Giotto. But to those who worship *God*, and who have obeyed the laws of heaven written in their hearts, and numbered the stars of it visible to them,—to these, a nearer star may rise; and a higher God be revealed.

You are to note, therefore, that Giotto's Soldan is the type of all noblest religion and law, in countries where the name of Christ has not been preached. There was no doubt what king or people should be chosen: the country of the three Magi had already been indicated by the miracle of Bethlehem; and the religion and morality of Zoroaster were the purest, and in spirit the oldest, in the heathen world. Therefore, when Dante, in the nineteenth and twentieth books of the *Paradise*, gives his final interpretation of the law of human and divine justice in relation to the gospel of Christ—the lower and enslaved body of the heathen being represented by St. Philip's convert, ("Christians like these the Ethiop shall condemn")—the noblest state of heathenism is at once chosen, as by Giotto: "What may the *Persians* say unto *your* kings?" Compare also Milton,—

"At the Soldan's chair,
Defied the best of Paynim chivalry."

And now, the time is come for you to look at Giotto's St. Louis, who is the type of a Christian king.

You would, I suppose, never have seen it at all, unless I had dragged you here on purpose. It was enough in the dark originally—is trebly darkened by the modern

painted glass—and dismissed to its oblivion contentedly by Mr. Murray's "Four saints, all much restored and repainted," and Messrs. Crowe and Cavalcasella's serene "The St. Louis is quite new."

Now, I am the last person to call any restoration whatever, judicious. Of all destructive manias, that of restoration is the frightfullest and foolishhest. Nevertheless, what good, in its miserable way, it can bring, the poor art scholar must now apply his common sense to take; there is no use, because a great work has been restored, in now passing it by altogether, not even looking for what instruction we still may find in its design, which will be more intelligible, if the restorer has had any conscience at all, to the ordinary spectator, than it would have been in the faded work. When, indeed, Mr. Murray's Guide tells you that a *building* has been 'magnificently restored,' you may pass the building by in resigned despair; for *that* means that every bit of the old sculpture has been destroyed, and modern vulgar copies put up in its place. But a restored picture or fresco will often be, to *you*, more useful than a pure one; and in all probability—if an important piece of art—it will have been spared in many places, cautiously completed in others, and still assert itself in a mysterious way—as Leonardo's Cenacolo does—through every phase of reproduction.*

* For a test of your feeling in the matter, having looked well at these two lower frescoes in this chapel, walk round into the next, and examine the lower one on your left hand as you enter that. You will find in your Murray that the frescoes in this chapel "were also, till lately,

But I can assure you, in the first place, that St. Louis is by no means altogether new. I have been up at it, and found most lovely and true colour left in many parts: the crown, which you will find, after our mornings at the

(1862) covered with whitewash"; but I happen to have a long critique of this particular picture written in the year 1845, and I see no change in it since then. Mr. Murray's critic also tells you to observe in it that "the daughter of Herodias playing on a violin is not unlike Perugino's treatment of similar subjects." By which Mr. Murray's critic means that the male musician playing on a violin, whom, without looking either at his dress, or at the rest of the fresco, he took for the daughter of Herodias, has a broad face. Allowing you the full benefit of this criticism—there is still a point or two more to be observed. This is the only fresco near the ground in which Giotto's work is untouched, at least, by the modern restorer. So felicitously safe it is, that you may learn from it at once and for ever, what good fresco painting is—how quiet—how delicately clear—how little coarsely or vulgarly attractive—how capable of the most tender light and shade, and of the most exquisite and enduring colour.

In this latter respect, this fresco stands almost alone among the works of Giotto; the striped curtain behind the table being wrought with a variety and fantasy of playing colour which Paul Veronese could not better at his best.

You will find, without difficulty, in spite of the faint tints, the daughter of Herodias in the middle of the picture—slowly *moving*, not dancing, to the violin music—she herself playing on a lyre. In the farther corner of the picture, she gives St. John's head to her mother; the face of Herodias is almost entirely faded, which may be a farther guarantee to you of the safety of the rest. The subject of the Apocalypse, highest on the right, is one of the most interesting mythic pictures in Florence; nor do I know any other so completely rendering the meaning of the scene between the woman in the wilderness, and the Dragon enemy. But it cannot be seen from the floor level: and I have no power of showing its beauty in words.

Spanish chapel, is of importance, nearly untouched ; the lines of the features and hair, though all more or less reproduced, still of definite and notable character ; and the junction throughout of added colour so careful, that the harmony of the whole, if not delicate with its old tenderness, is at least, in its coarser way, solemn and unbroken. Such as the figure remains, it still possesses extreme beauty—profoundest interest. And, as you can see it from below with your glass, it leaves little to be desired, and may be dwelt upon with more profit than nine out of ten of the renowned pictures of the Tribune or the Pitti. You will enter into the spirit of it better if I first translate for you a little piece from the *Fioretti di San Francesco*.

“How St. Louis, King of France, went personally in the guise of a pilgrim, to Perugia, to visit the holy Brother Giles.—St. Louis, King of France, went on pilgrimage to visit the sanctuaries of the world ; and hearing the most great fame of the holiness of Brother Giles, who had been among the first companions of St. Francis, put it in his heart, and determined assuredly that he would visit him personally ; wherefore he came to Perugia, where was then staying the said brother. And coming to the gate of the place of the Brothers, with few companions, and being unknown, he asked with great earnestness for Brother Giles, telling nothing to the porter who he was that asked. The porter, therefore, goes to Brother Giles, and says that there is a pilgrim asking for him at the gate. And by God it was inspired in him and revealed that it was the

King of France; whereupon quickly with great fervour he left his cell and ran to the gate, and without any question asked, or ever having seen each other before, kneeling down together with greatest devotion, they embraced and kissed each other with as much familiarity as if for a long time they had held great friendship; but all the while neither the one nor the other spoke, but stayed, so embraced, with such signs of charitable love, in silence. And so having remained for a great while, they parted from one another, and St. Louis went on his way, and Brother Giles returned to his cell. And the King being gone, one of the brethren asked of his companion who he was, who answered that he was the King of France. Of which the other brothers being told, were in the greatest melancholy because Brother Giles had never said a word to him; and murmuring at it, they said, ‘Oh, Brother Giles, wherefore hadst thou so country manners that to so holy a king, who had come from France to see thee and hear from thee some good word, thou hast spoken nothing?’


“Answered Brother Giles: ‘Dearest brothers, wonder not ye at this, that neither I to him, nor he to me, could speak a word; for so soon as we had embraced, the light of the divine wisdom revealed and manifested, to me, his heart, and to him, mine; and so by divine operation we looked each in the other’s heart on what we would have said to one another, and knew it better far than if we had spoken with the mouth, and with more consolation, because of the defect of the human tongue, which cannot

clearly express the secrets of God, and would have been for discomfort rather than comfort. And know, therefore, that the King parted from me marvellously content, and comforted in his mind."

Of all which story, not a word, of course, is credible by any rational person.

Certainly not: the spirit, nevertheless, which created the story, is an entirely indisputable fact in the history of Italy and of mankind. Whether St. Louis and Brother Giles ever knelt together in the street of Perugia matters not a whit. That a king and a poor monk could be conceived to have thoughts of each other which no words could speak; and that indeed the King's tenderness and humility made such a tale credible to the people,—this is what you have to meditate on here.

Nor is there any better spot in the world,—whencesoever your pilgrim feet may have journeyed to it, wherein to make up so much mind as you have in you for the making, concerning the nature of Kinghood and Princesdom generally; and of the forgeries and mockeries of both which are too often manifested in their room. For it happens that this Christian and this Persian King are better painted here by Giotto than elsewhere by any one, so as to give you the best attainable conception of the Christian and Heathen powers which have both received, in the book which Christians profess to reverence, the same epithet as the King of the Jews Himself; anointed, or Christos:—and as the most perfect Christian Kinghood was exhibited in the life, partly real, partly traditional, of



St. Louis, so the most perfect Heathen Kinghood was exemplified in the life, partly real, partly traditional, of Cyrus of Persia, and in the laws for human government and education which had chief force in his dynasty. And before the images of these two Kings I think therefore it will be well that you should read the charge to Cyrus, written by Isaiah. The second clause of it, if not all, will here become memorable to you—literally illustrating, as it does, the very manner of the defeat of the Zoroastrian Magi, on which Giotto founds his Triumph of Faith. I write the leading sentences continuously; what I omit is only their amplification, which you can easily refer to at home. (Isaiah xlv. 24, to xlv. 13.)

“Thus saith the Lord, thy Redeemer, and he that formed thee from the womb. I the Lord that maketh all; that stretcheth forth the heavens, alone; that spreadeth abroad the earth, alone; *that turneth wise men backward, and maketh their knowledge, foolish; that confirmeth the word of his Servant, and fulfilleth the counsel of his messengers*: that saith of Cyrus, He is my Shepherd, and shall perform all my pleasure, even saying to Jerusalem, ‘thou shalt be built,’ and to the temple, ‘thy foundations shall be laid.’

“Thus saith the Lord to his Christ;—to Cyrus, whose right hand I have holden, to subdue nations before him, and I will loose the loins of Kings.

“I will go before thee, and make the crooked places straight; I will break in pieces the gates of brass, and cut in sunder the bars of iron; and I will give *thee* the treas-

ures of darkness, and hidden riches of secret places, that thou mayest know that I the Lord, which call thee by thy name, am the God of Israel.

“For Jacob my servant’s sake, and Israel mine elect, I have even called thee by thy name; I have surnamed thee, though thou hast not known me.

“I am the Lord, and there is none else; there is no God beside me. I girded thee, though thou hast not known me. That they may know, from the *rising of the sun*, and from the west, that there is none beside me; I am the Lord and there is none else. *I form the light*, and create darkness; I make peace, and create evil. I the Lord do all these things.

“I have raised him up in Righteousness, and will direct all his ways; he shall build my city, and let go my captives, not for price nor reward, saith the Lord of Nations.”

To this last verse, add the ordinance of Cyrus in fulfilling it, that you may understand what is meant by a King’s being “raised up in Righteousness,” and notice, with respect to the picture under which you stand, the Persian King’s thought of the Jewish temple.

“In the first year of the reign of Cyrus,* King Cyrus commanded that the house of the Lord at Jerusalem should be built again, *where they do service with perpetual fire*; (the italicized sentence is Darius’s, quoting Cyrus’s decree—the decree itself worded thus,) Thus saith Cyrus,

* 1st Esdras vi. 24.

King of Persia: * The Lord God of heaven hath given me all the kingdoms of the earth, and he hath charged me to build him an house at Jerusalem.


“Who is there among you of all his people?—his God be with him, and let him go up to Jerusalem which is in Judah, and let the men of his place help him with silver and with gold, and with goods and with beasts.”

Between which “bringing the prisoners out of captivity” and modern liberty, free trade, and anti-slavery eloquence, there is no small interval.

To these two ideals of Kinghood, then, the boy has reached, since the day he was drawing the lamb on the stone, as Cinabue passed by. You will not find two other such, that I know of, in the west of Europe; and yet there has been many a try at the painting of crowned heads,—and King George III. and Queen Charlotte, by Sir Joshua Reynolds, are very fine, no doubt. Also your black-muzzled kings of Velasquez, and Vandyke’s long-haired and white-handed ones; and Rubens’ riders—in those handsome boots. Pass such shadows of them as you can summon, rapidly before your memory—then look at this St. Louis.

His face—gentle, resolute, glacial-pure, thin-cheeked; so sharp at the chin that the entire head is almost of the form of a knight’s shield—the hair short on the forehead, falling on each side in the old Greek-Etruscan curves of simplest line, to the neck; I don’t know if you can see

* Ezra i. 3, and 2nd Esdras ii. 3.



without being nearer, the difference in the arrangement of it on the two sides—the mass of it on the right shoulder bending inwards, while that on the left falls straight. It is one of the pretty changes which a modern workman would never dream of—and which assures me the restorer has followed the old lines rightly.

He wears a crown formed by an hexagonal pyramid, beaded with pearls on the edges; and walled round, above the brow, with a vertical fortress-parapet, as it were, rising into sharp pointed spines at the angles: it is chasing of gold with pearl—beautiful in the remaining work of it; the Soldan wears a crown of the same general form; the hexagonal outline signifying all order, strength, and royal economy. We shall see farther symbolism of this kind, soon, by Simon Memmi, in the Spanish chapel.

I cannot tell you anything definite of the two other frescoes—for I can only examine one or two pictures in a day; and never begin with one till I have done with another; and I had to leave Florence without looking at these—even so far as to be quite sure of their subjects. The central one on the left is either the twelfth subject of Assisi—St. Francis in Ecstasy;* or the eighteenth; the Apparition of St. Francis at Arles;† while the lowest on

* “Represented” (next to St. Francis before the Soldan, at Assisi) “as seen one night by the brethren, praying, elevated from the ground, his hands extended like the cross, and surrounded by a shining cloud.”—*Lord Lindsay*.

† “St. Anthony of Padua was preaching at a general chapter of the order, held at Arles, in 1224, when St. Francis appeared in the

the right may admit choice between two subjects in each half of it: my own reading of them would be—that they are the twenty-first and twenty-fifth subjects of Assisi, the Dying Friar * and Vision of Pope Gregory IX.; † but Crowe and Cavalcasella may be right in their different interpretation; ‡ in any case, the meaning of the entire system of work remains unchanged, as I have given it above.

midst, his arms extended, and in an attitude of benediction.”—*Lord Lindsay.*

* “A brother of the order, lying on his deathbed, saw the spirit of St. Francis rising to heaven, and springing forward, cried, ‘Tarry, Father, I come with thee!’ and fell back dead.”—*Lord Lindsay.*

† “He hesitated, before canonizing St. Francis; doubting the celestial infliction of the stigmata. St. Francis appeared to him in a vision, and with a severe countenance reproving his unbelief, opened his robe, and, exposing the wound in his side, filled a vial with the blood that flowed from it, and gave it to the Pope, who awoke and found it in his hand.”—*Lord Lindsay.*

‡ “As St. Francis was carried on his bed of sickness to St. Maria degli Angeli, he stopped at an hospital on the roadside, and ordering his attendants to turn his head in the direction of Assisi, he rose in his litter and said, ‘Blessed be thou amongst cities! may the blessing of God cling to thee, oh holy place, for by thee shall many souls be saved;’ and, having said this, he lay down and was carried on to St. Maria degli Angeli. On the evening of the 4th of October his death was revealed at the very hour to the bishop of Assisi on Mount Sarzana.”—*Crowe and Cavalcasella.*





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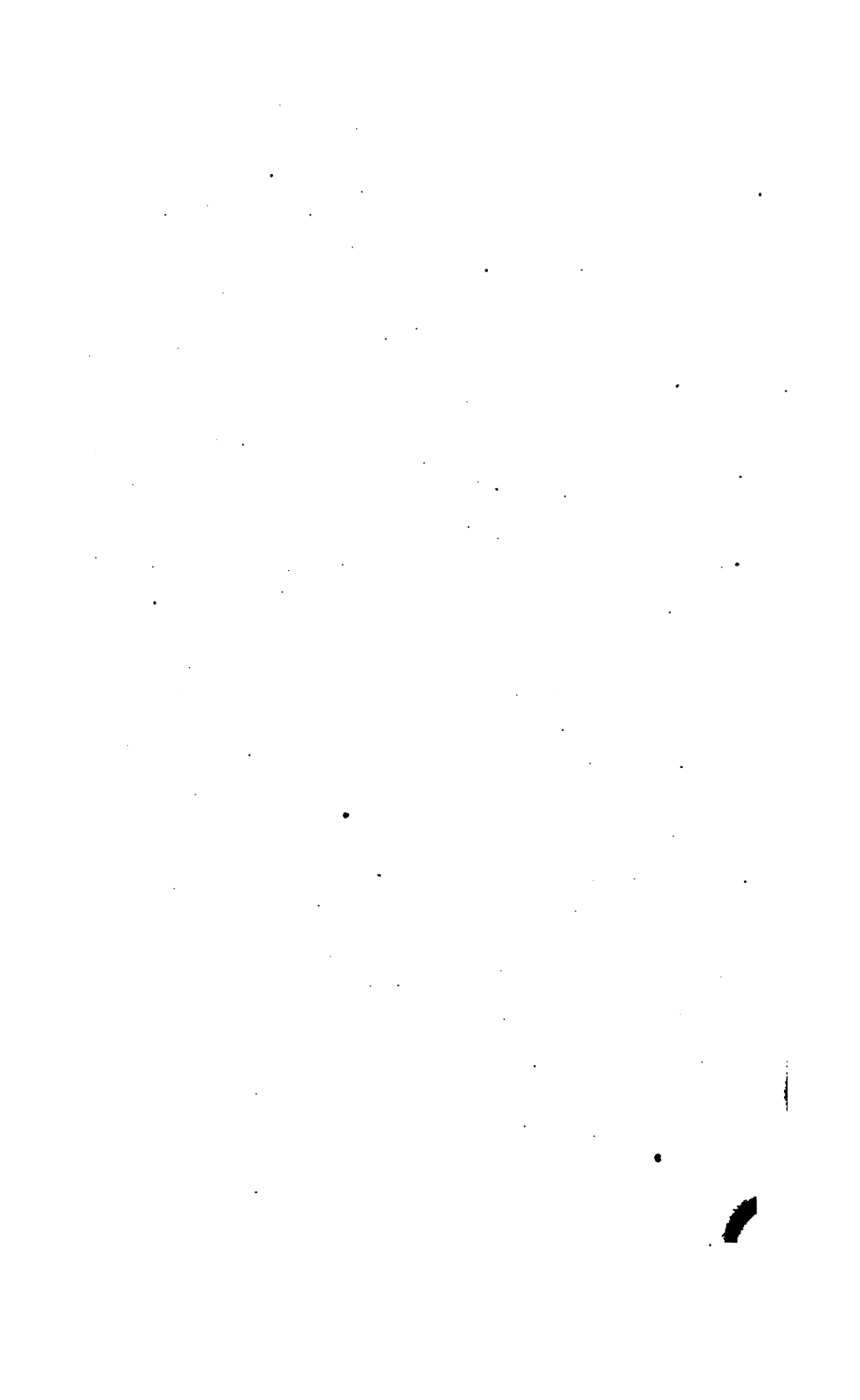
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